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УО «Витебский государственный медицинский университет»

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ОБЩЕСТВЕННОЕ ЗДОРОВЬЕ И ЗДРАВООХРАНЕНИЕ: РУКОВОДСТВО ПО ПРАКТИЧЕСКИМ НАВЫКАМ

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PUBLIC HEALTH AND HEALTH SERVICE: GUIDE TO PRACTICAL SKILLS

учебно-методическое пособие

Рекомендовано учебно-методическим объединением по высшему медицинскому, фармацевтическому образованию в качестве учебно-методического пособия для студентов учреждений высшего образования, обучающихся по специальности
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Учебно-методическое пособие «Общественное здоровье и здравоохранение: руководство по практическим навыкам» по дисциплине соответствует типовому учебному плану и типовой учебной программе по предмету, утвержденным Министерством здравоохранения Республики Беларусь. Пособие включает описание необходимых для изучения дисциплины практических навыков с примерами и алгоритмами их решения, а также варианты практических индивидуальных заданий для студентов.

Учебно-методическое пособие предназначено для студентов факультета подготовки иностранных граждан с английским языком обучения, стоматологического факультета с английским языком обучения, интернов, клинических ординаторов, врачей, слушателей ФПК и ПК, врачей общей практики, магистрантов, аспирантов и соискателей ученых степеней высших медицинских учреждений образования, изучающих общественное здоровье и здравоохранение на английском языке.

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CONTENT

PRACTICAL SKILL № 1

PLAN AND PROGRAM OF STATISTICAL RESEARCH OF THE HEALTH STATUS OF THE POPULATION

Statistical research allows you to get an idea of a particular phenomenon, to study its size, level, to identify patterns. The subject of statistical research can be the health of the population, the organization of medical care, environmental factors affecting health, etc.

Any research starts with the preparation of its program and plan. The research program is a set of provisions that define the goals and objectives of the study, the subject and conditions of its implementation, the resources used, as well as the expected result.

The concept of the research plan is very close to the program. Sometimes they're even identified. But often they have a difference in the purpose and practical use of both the program and the plan. The program is considered as a means of achieving the goal, the form of its specification, and the plan — as an organizing factor of consistent movement towards the goal.

The program is developed on the basis of the definition and understanding of the goals of the organization (company, Corporation, enterprise, office, etc.), determining the problems of its development, the allocation of solving problems that promote development to the goal in the shortest way. The program should give a clear answer to the questions: why is it necessary to conduct research, what do we want to explore and what means and methods should we use. It should contain a rationale for the relevance and importance of the problem as a subject of research, the necessary conditions for the successful solution of this problem (funding, staffing, organizational conditions, time constraints, etc.).

The program usually consists of the following sections: the object of study, the purpose of the research, the content of the problem, its relevance and importance, the paradigm and working hypothesis of solving the problem in the research process, the provision of research resources (nothing can be done without anything), the expected result and effectiveness of the study.

Stages of statistical research

***Stage 1*.** Preparation of the plan and program of the study is preparatory, it determines the purpose and objectives of the study, the plan and program of the study, the program of the summary of statistical material and organizational issues.

A) the purpose and objectives of the study should be clearly formulated; the purpose defines the main direction of the study and is, as a rule, not only theoretical but also practical, it is formulated clearly, clearly, unambiguously; to disclose the goal of the research objectives are defined.

B) it is necessary to study the literature on this topic.

C) it is necessary to develop an Organizational plan – provides for the definition of

1) place (administrative-territorial boundaries of observation),
2) time (specific terms of observation, development and analysis of the material) and
3) the subject of the study (organizers, performers, methodological and organizational guidance, sources of funding for the study).

D) it is necessary to make the program of research (supervision) – includes:

- definition of observation unit;
- list of issues (accounting features) to be registered in respect of each observation unit
- development of an individual accounting (registration) form with a list of issues and features to be taken into account;
- development of table layouts, which are then made the results of the study.

For each observation unit, a separate form is filled out, it contains the passport part, clearly formulated, put in a certain sequence the questions of the program and the date of completion of the document. As accounting forms can be used in practice of medical institutions accounting forms.

Sources of information can be other medical documents (medical records, and individual cards of the outpatient patient, history of development of the child, history of childbirth), reporting forms of medical institutions, etc.

To ensure the possibility of statistical development of data from these documents, copy the information on specially designed accounting forms, the content of which is determined in each case in accordance with the objectives of the study.

E) it is necessary to make the program of the summary of the received data which includes establishment of the principles of grouping, allocation of grouping signs, Definition of combinations of these signs, drawing up models of statistical tables.

F) development of the research Plan-includes the definition of:

- the object of study (statistical population);
- scope of the study (continuous, non-continuous);
- species (current, one-time);
- methods of collecting statistical information.

Example. Develop a program of statistical research of the health of the population served by the territorial polyclinic: "The incidence of influenza" Suggest ways to reduce the incidence of influenza.

First step – formation ***program*** of statistical research:

a. determination of **object** of research (*help:* on whom it is investigated - patients in the department, group of people) – *the patient with the flu on the territorial site in the clinic.*
b. determination of **aim (purpose)** of research (help: 1st sentence in your task) – *Develop a program of statistical research of the health of the population served by the territorial polyclinic: "The incidence of influenza";*
c. definition of **research objectives** (they detail and specify the goal);
d. determination of **unit of observation** (subject) – *each case of influenza in the territorial polyclinic;*
e. determination of **accounting features** (characterize unit of observation) – *age, sex, duration of treatment, profession, chronic diseases;*
f. **accounting documents** – *Medical card of patient, Paper of temporary disability, Medical certificate of death;*
g. making the table:

Duration of treatment / Profession / Chronic diseases	***18-30 years***		***31-45 years***		***46-65 years***		***66-79 years***		***80 years and more***	
	m	***f***	***m***	***f***	***m***	***f***	***m***	***f***	***m***	***f***
1-7 days										
8-15 days										
16-30 days										
31 and more days										

Second step – formation ***plan*** of statistical research:

a. determination of **place** of research - *department of the territorial polyclinic in the district centre A, B, C, N.*
b. **time** of research: *3 years, 5 years, 2010-2015.*
c. determination of **person, who will investigate** – *students, doctors.*
d. research **funding**.
e. determination of **supervisor** of research – *supervisor; head of Department at the clinic.*
f. determination of **surveillance coverage** – *current, one-time research (depends on the time of observation).*

Stage 2. Collection of material (statistical observation) – is the registration of individual cases of the phenomenon under study and characterizing their accounting features in the registration forms. Before and during performance of this work instructing (oral or written) performers of supervision, providing them with forms of registration is carried out.

Statistical observation can be:

A) at the time:

1) ***Current*** – the phenomenon is studied for a certain period of time (week, quarter, year, etc.) by daily registration of the phenomenon as each case

occurs (taking into account the number of births, deaths, illnesses discharged from the hospital). This takes into account the rapidly changing phenomena.

2) ***One-time*** – statistical data are collected at a certain (critical) point in time (population census, study of physical development of children, preventive examinations of the population). One-time registration reflects the state of the phenomenon at the time of study, is used to study slowly changing phenomena.

The choice of the type of follow – up is determined by the purpose and objectives of the study (the characteristics of hospitalized patients can be obtained as a result of the current registration of patients who have left the hospital – current observation or by a one-day census of patients in the hospital-one-time observation).

B) depending on the completeness of the studied phenomenon:

1) ***Continuous*** – all units of observation that are part of the population, i.e. the General population, are studied. Carried out in order to establish the absolute size of the phenomenon (total population, total number of births or deaths). It is also used in cases where information is necessary for operational work (accounting for infectious diseases, load of doctors, etc.).)

2) ***Not continuous*** – only a part of the General population is studied, divided into several types: Monographic method, the method of the main array, Questionnaire method, Sampling method.

Stage 3. Development of the material, statistical grouping and summary-begins with checking and clarifying the number of observations, completeness and correctness of the information received, identifying and eliminating errors.

Stage 4. Statistical analysis of the phenomenon under study, the formulation of conclusions-the crucial stage of the study, which is the calculation of statistical indicators (frequency, structure, average size of the phenomenon under study), given their graphical image, studied dynamics, trends, established links between phenomena. Given forecasts, etc. Analysis involves the interpretation of the obtained data, the reliability of the research results. In conclusion, conclusions are drawn.

Stage 5. Literary processing and execution of the results – is the final, involves the final registration of the results of statistical research. The results can be in the form of article, report, thesis etc. For each design, there are certain requirements that must be respected in the literary processing of the results of statistical research.

TASKS FOR SELF-ACCESS WORK

Option 1. To study the acute infectious morbidity according to the reporting of the infectious diseases hospital in the city B for 5 years. Develop a set of measures to reduce acute infectious morbidity.

A unit of account is to count every case of an acute infectious disease. As accounting documents use the "Journal of Infectious Diseases" (f. 60/u), “Report on diseases of the flu and other acute respiratory diseases” (f. 3), “Report on selected infectious and parasitic diseases for the year” (f. 2).

Option 2. To study the hospitalized morbidity of the population of the city N according to the results of the reporting year of the city hospital activities. Develop a set of measures in the work of the clinic and hospital of the city hospital; develop measures to optimize bed capacity.

The unit of account is the case of hospitalization of the patient in the hospital for the disease. As accounting documents, use the “Statistical card discharged from the hospital” (f. 066/u), the Statistical coupon (f. 025-2/u), and also the inpatient card (f. 003).

Option 3. To study the incidence (level, frequency and structure) of the population in the city N according to the causes of death. Identify diseases that contribute the largest share in the structure of mortality; develop a set of measures to reduce the mortality rate of people of working age.

The unit of account is to count each death case among people of working age. As records, use the "Medical Death Certificate" (f. 106/u).

Option 4. To study the primary incidence of the population served by polyclinic A, to identify contingents of persons with elevated levels of primary morbidity. To develop a set of measures aimed at improving the health of the identified contingent.

The unit of observation is the first visit in the studied year about the disease. As accounting documents use statistical coupons (f. 025-2/u), the attendance records.

PRACTICAL SKILL № 2

CALCULATION, ANALYSIS AND ASSESSMENT OF RELATIVE VALUES (INTENSIVE INDICATORS, EXTENSIVE INDICATORS, INDICATORS OF RATIO AND INDICATORS OF VISIBILITY), USED TO CHARACTERIZE THE HEALTH STATUS OF THE POPULATION OF THE REGION

Relative statistical values are the values that Express quantitative relations between socio-economic phenomena or their characteristics.

They are obtained by dividing one quantity by another. Most often, the relative values are the ratios of two absolute values.

The value with which a comparison is made (the denominator), commonly called the basis of the relative magnitude, base of comparison or reference value, and that which is compared is called current, or compare the reported size.

The relative value shows how many times the compared value is greater than the base value or what proportion of the first is from the second.

With the help of relative values, many facts of social life are expressed: the percentage of the plan, the growth rate and growth, etc.

Depending on the purpose of the statistical study, the relative values are divided into the following types:

- the relative value of the dynamics;
- relative value of the target;
- the relative value of the job;
- the relative value of the structure;
- relative value of coordination;
- relative value of comparison;
- relative intensity value.

There are four types of relative values: *intensive, extensive, ratio indicators, visibility indicators.*

Intensive indicators – show the frequency of the phenomenon in the environment. As the environment is usually a certain set of objects (population, patients, cases), some of which occurs some phenomenon. Calculated using the following formula:

$$I.i. = \frac{Phenomenon}{Medium} \times coefficient\ (often\ 1000).$$

The coefficient is used for convenience of representation of the indicator, represents various degrees of number 10 and usually accepts values 100, 1000, 10,000, 100,000. Its value depends on the frequency of occurrence of the phenomenon: the less common, the greater the coefficient. Thus, the birth rate,

mortality rate, and overall morbidity rate of the population are usually calculated per 1,000 people. When calculating maternal mortality rates, as a much more rare event, use a factor of 100,000. On the contrary, the frequency of the common phenomenon of temporary disability is calculated per 100 workers.

Example of calculation of intensive indicator:

For year in hospital N. 360 surgical operations were performed. In 54 cases, various complications were observed in the postoperative period. Find the frequency of postoperative complications per 100 operations.

Solution: the frequency of postoperative complications is an intensive indicator that can be calculated as the ratio of the phenomenon to the environment. The environment is a set of operations (360), of which in 54 cases, as follows from the conditions of the problem, there was a phenomenon - there were postoperative complications. Thus:

$$Postoperative\ complications\ rate = \frac{Number\ of\ postoperative\ complications}{Number\ of\ operations\ performed} \times 100 = \frac{54}{360} \times 100 = 15\ \%.$$

The value of the coefficient is assumed to be 100, since the problem condition asks the frequency calculated for 100 operations performed.

Answer: the frequency of postoperative complications in the hospital N. for the year amounted to 15 cases per 100 performed operations.

Extensive indicators – characterize the structure of the phenomenon, measured as a percentage, rarely-in ppm or fractions of a unit. Extensive values show what part is a separate group of units in the structure of the whole population. Calculated by the formula:

$$E.i. = \frac{Part}{Whole} \times 100\ \%.$$

Example of calculation of an extensive indicator:

In the study of the effectiveness of treatment of pneumonia with the use of a new antibiotic, 200 patients took part, 90 of them - men. It is necessary to determine the proportion of men among the subjects, the result is expressed in %.

Solution: male Patients represent a fraction of the total population studied. Therefore, we should use the formula to calculate extensive indicators:

$$\text{Proportion of male patients among all subjects} = \frac{\text{Number of males}}{\text{Number of all subjects}} \times 100\% = \frac{90}{200} \times 100\% = 45\ \%.$$

Answer: the share of patients in the structure of the study is 45%.

Ratio indicators – characterize the ratio of two unrelated populations. These aggregates can be measured in the same values, the main condition that their changes should occur independently of each other. Usually in this form are

represented by various indices, coefficients, indicators of security of the population. Calculated using the following formula:

$$RI = \frac{First\ set}{Second\ set} \times coefficient\ (10{,}000).$$

The coefficient usually takes the values 1 (for indices) or 10 000 (for indicators of population security).

Example of calculation of ratio:

One of the districts of the Republic of Belarus has a population of 40,000. 384 inpatient beds are deployed in the medical and preventive institutions of the district. What is the availability of beds in the area?

Solution: we have two sets: population and stationary beds. Changes in the number of the population do not depend on changes in the number of stationary beds and Vice versa, in connection with which we conclude that the presented populations are not interconnected. We calculate the indicator of provision of the population with stationary beds:

$$Availability\ of\ beds = \frac{Number\ of\ beds}{Population} \times 10{,}000 = \frac{384}{40000} \times 10{,}000 = 96.$$

Answer: the provision of the population with stationary beds is 96 per 10000 population.

The ***indicator of visibility*** is the ratio of each level of the series (intensive indicator) to one of them (more often the first or the last), taken as 100%.

I.e. designed the first intensive index is taken as an indicator of the visibility of *100%* and the others calculated intensive parameters are accepted *x*%. Next, the method of mathematical proportion (cross-calculation) is calculated *x* (visibility index) for each of the intensive parameter.

Example. Using the data resulted in the table, calculate relative sizes (intensive indicators, extensive indicators, indicators of a ratio, indicators of visibility). Make the analysis and conclusion.

Population of different age groups in area of activity of a polyclinic, number of doctors, number of resorts behind medical aid

Age group	***Number of population***	***Number of visits for medical aid***	***Number of doctors***
15-19 years	2500	1500	-
20-59 years	5000	15000	-
60 years are more	10000	10000	-
TOTAL:	17500	26500	25

Intensive indicators:

$$Visits\ rate\ (‰) = \frac{Number\ of\ visits\ for\ medical\ aid\ (15-19\ years)/(20-59\ years)/\ (60\ years\ are\ more)\ \times 1000}{Number\ of\ population};$$

Extensive indicators:

$$Structure\ of\ visits\ of\ age\ group\ (\%) = \frac{Number\ of\ visits\ for\ medical\ aid\ (15-19\ years),(20-59\ years),(60\ years\ are\ more)\ \times 100}{Total\ number\ of\ visits};$$

$$\text{Indicators of a ratio } (^{\circ}/_{ooo}) = \frac{Number\ of\ doctors\ \times 10{,}000}{Total\ number\ of\ population}$$

TASKS FOR SELF-ACCESS WORK

Option 1. Using the data resulted in the table, calculate relative sizes (intensive indicators, extensive indicators, indicators of a ratio, indicators of visibility). Make the analysis and conclusion.

The population of different ages in the area of the city polyclinic №3

Age group	***Number of population***	***Number of visits for medical aid***	***Number of doctors***
15-19 years	3500	1500	-
20-59 years	35000	30000	-
60-69 years	7000	9000	
70 years are more	3000	1500	-
TOTAL:	48500	42000	35

Option 2. Using the data resulted in the table, calculate relative sizes (intensive indicators, extensive indicators, indicators of a ratio, indicators of visibility). Make the analysis and conclusion.

The population of different ages in the area of the city polyclinic №4

Age group	***Number of population***	***Number of visits for medical aid***	***Number of doctors***
15-19 years	4000	1500	-
20-59 years	40000	30000	-
60-69 years	10000	12000	
60 years are more	2000	1300	-
TOTAL:	56000	44800	40

Option 3. Using the data resulted in the table, calculate relative sizes (intensive indicators, extensive indicators, indicators of a ratio, indicators of visibility). Make the analysis and conclusion.

The population of children by age groups in the area of the children's polyclinic №2

Age group	***Number of population***	***Number of visits for medical aid***	***Number of doctors***
0-1 years	3500	3000	-
1-3 years	4000	3700	-
4-14 years	75000	5300	-
TOTAL:	15000	12000	17

Option 4. Using the data resulted in the table, calculate relative sizes (intensive indicators, extensive indicators, indicators of a ratio, indicators of visibility). Make the analysis and conclusion.

The population of children by age groups in the area of the children's polyclinic №5

Age group	***Number of population***	***Number of visits for medical aid***	***Number of doctors***
0-1 years	2500	2000	-
1-3 years	3000	2500	-
4-14 years	4500	3500	-
TOTAL:	10000	8000	12

PRACTICAL SKILL № 3

A GRAPHICAL REPRESENTATION OF RELATIVE VALUES

One of the methods of analysis of statistical materials is their graphic representation.

A ***statistical graph*** is a drawing in which statistical aggregates, characterized by certain indicators, are described using conditional geometric images or signs. The presentation of the table data in the form of a graph makes a stronger impression than the figures, allows to better understand the results of statistical observation, to interpret them correctly, greatly facilitates the understanding of statistical material, makes it clear and accessible. This, however, does not mean that the graphs have only illustrated value. They give new knowledge about the subject of research, being a method of generalization of initial information.

When building a graphic image, you must comply with a number of requirements. First of all, the graph should be sufficiently clear, since the whole point of the graphic image is to visualize the statistical indicators. In addition, the graph should be expressive, understandable and understandable. To meet the above requirements, each chart must include a number of basic elements: a graphic image; a graphic field; spatial reference points; scale reference points; and an explication of the chart.

Graphic image is a geometric signs, i.e. a set of points, lines, shapes, which displayed statistical figures.

The ***graphics field*** is the part of the plane where the graphics are located. The graph field has certain dimensions, which depend on its purpose.

The ***spatial reference points*** of the graph are defined as a *system of coordinate grids*. The coordinate system is required to place geometric characters in the graph field.

The ***scale reference points*** of the statistical chart are determined by the scale and the system of scale scales. The scale of a statistical graph is a measure of the translation of a numerical value into a graphical value.

A scale is a line whose individual points can be read as certain numbers. The scale is of great importance in the chart and includes three elements: a line (or scale carrier), a certain number of points marked with dashes, which are located on the scale carrier in a certain order, a digital designation of numbers corresponding to individual marked points.

The use of a graphical method in statistical study, makes studying the figures more clear, easy to understand, allows us to better analyze them. The graphical method should be widely used in any statistical study.

In connection statistics, the most common graphs are charts. A chart is a drawing in which statistics are represented by geometric lines, shapes, and bodies. The most popular are line, bar, and sector charts. With the help of linear

and bar charts it is possible to depict the dynamics of phenomena, the dependence of one phenomenon on another, the fulfillment of contractual obligations (implementation of the plan), the planned task.

Bar (or ribbon) diagram, in addition, clearly represents a comparison of phenomena among themselves.

Sector (circular) – characterizes the structure of the population. The structure can also be represented by bar or bar charts.

If it is required to reflect the saturation of a phenomenon in a certain territory, ***cartograms or cartograms*** are used (for example, to reflect the provision of population with telephones).

The ***cartogram*** reflects the intensity of a feature on a geographical map.

Cartodiagram is a combination of geographical maps and charts. A striking example of maps are geographical maps, which within the individual administrative-territorial units are shown diagrams characterizing the absolute value of a particular indicator (for example, in areas reflecting the areas of the city, bar charts showing the number of district postal communication nodes in these areas).

Graphic image can be of 3 types:

1) charts;

2) cartograms;

3) cartocharts.

Charts – graphical representation of statistical data using lines and geometric shapes. They are in turn divided into:

1) line charts;

2) planar graphs (bar, pie);

3) volume charts.

When constructing any kind of diagrams, the following conditions must be met:

1) know the indications for their use;

2) each chart should have a clear, concise inscription indicating the time, place, which include the depicted data;

3) the diagram should be based on a certain scale;

4) each diagram should be accompanied by written explanations.

Line charts – this is the most suitable type of graph to show the dynamics of the phenomenon in time (for example, fertility, mortality, morbidity over a number of years, etc.).

Planar charts (in particular, ***bar charts***) are used more often when it is necessary to compare values of the phenomenon for the same period or on the same date (for example, mortality of men and women for some year, provision of the population with hospital beds in various regions of Russia, etc.).

For image distribution variable (extensive) use of the ***sector, intrabar*** chart.

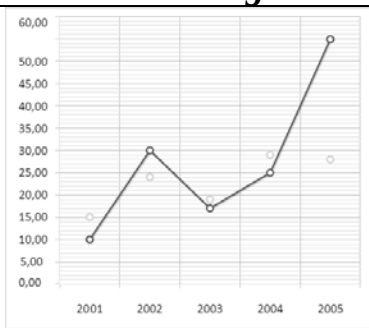
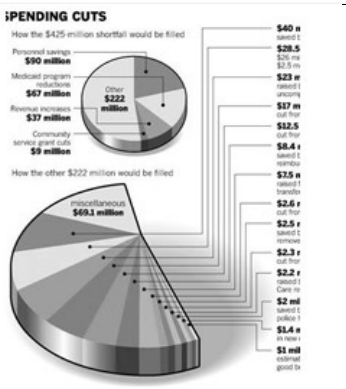
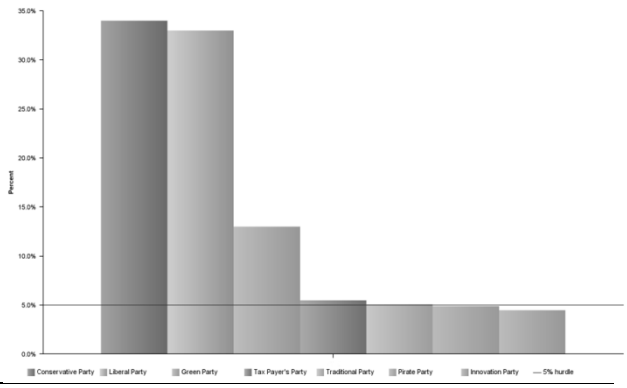
A ***cartogram*** is a contour map of a city, region, etc., on which different levels of a phenomenon are represented by hatching or different colors.

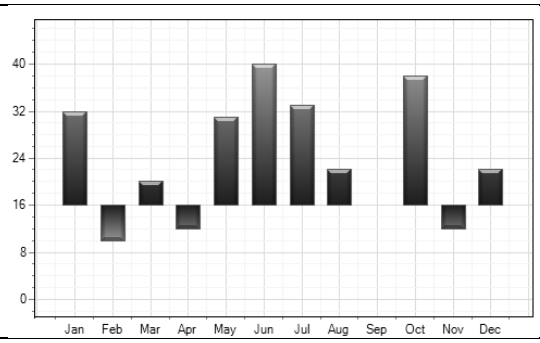
Cartochart is an image of a geographical map of a particular chart.

In the final part of phase IV, conclusions and concrete proposals for practical health care need to be formulated concisely and clearly.

If we compare the two ways of presenting statistical data – tabular and graphical, we can conclude that statistical tables allow in a compact and rational form to record all the data on the phenomenon under study, and with the help of graphs you can get a visual representation of the ratio of indicators, the dynamics of phenomena, to show patterns of phenomena and processes in the communication industry.

Chart examples:

Chart name	***Chart image***
LINE chart	
PIE chart	
BAR chart	

INTRABAR chart	

TASKS FOR SELF-ACCESS WORK

Option 1. Present the structure of the appeal for medical care by age groups in the form of a pie chart. The structure of appeal for medical care: 15-19 years – 4%, 20-59 years – 72%, 60-69 years – 20%, 70 years and more – 4%.

Option 2. Present the structure of the appeal for medical care for the female population of childbearing age in the area of the women's consultation №1 in the form of a pie chart. The structure of the appeal for medical care of the female population of childbearing age: 15-19 years – 2%, 20-24 years – 30%, 25-29 years – 40%, 30 34 years – 12%, 35-39 years – 8%, 40-44 years – 5%, 45-49 years – 3%.

Option 3. Present the levels of appealability of children of different age groups for medical care in the area of the children's polyclinic №3 in the form of a bar chart. The structure of the appealability of children for medical help: 0-1 years – 20%, 1-3 years – 35%, 4-14 years – 45%.

Option 4. Infant mortality in the Republic of Belarus was: in 2011 — 9.3‰, in 2012 —9.1‰, in 2013 —7.8‰, in 2014 —7.7‰, in 2015 —6.9‰. Submit data graphically.

PRACTICAL SKILL № 4

COMPILING A SIMPLE VARIATIONAL SERIES WITH A SMALL NUMBER OF OBSERVATIONS (<30) AND CALCULATION OF SIMPLE AVERAGE

The variation series is a statistical series showing the distribution of the studied phenomenon by the value of any quantitative trait. For example, patients by age, terms of treatment, newborn by weight, etc.

Variant – separate values of the attribute by which the grouping is carried out (indicated by V).

Frequency – a number indicating how often a particular variant occurs (denoted by P). The sum of all frequencies shows the total number of observations and is denoted by n. The difference between the largest and the smallest variation of the series is called the magnitude or amplitude.

There are variational series:

1. Discontinuous (discrete) and continuous.

A series is considered to be continuous if the grouping characteristic can be expressed by fractional values (weight, height, etc.), discontinuous if the grouping characteristic is expressed only by an integer (days of disability, number of heartbeats, etc.).

2. Grouped (interval) and ungrouped.

A grouped series has variants grouped into groups that combine them in size within a certain interval. In an ungrouped series, each individual variant corresponds to a certain frequency.

3. Odd and even.

In even variational series the sum of frequencies or the total number of observations is expressed by an even number, in odd — by an odd number.

4. Symmetrical and asymmetrical.

In the symmetric variational series all types of averages coincide or are very close (mode, median, arithmetic mean).

The variation series is used to describe large arrays of numbers, it is in this form that the collected data of most medical studies are initially presented. In order to characterize the variation series, special indicators are calculated, including averages, variability indicators (so-called dispersion), representative indicators of sample data.

A simple average is an average term, in determining which the total volume of a given trait in the data set is equally distributed among all units belonging to a given set. Thus, the average annual output per worker – this is the amount of production that would fall on each employee, if the entire volume of output is equally distributed among all employees of the organization. A simple arithmetic mean value is calculated by the formula:

$$x = \frac{(X_1 + X_2 + \ldots + X_n)}{n} = \sum \frac{X_1}{n}$$

Simple average is equal to the ratio of the sum of individual values of a trait to the number of traits in the aggregate.

$$x = \frac{\sum_{i=1}^{n} x_i}{n}$$

Example. A team of emergency medical doctors, standing of 5 medical workers and 1 driver receives a month 3 3,2 3,3 3,5 3,8 3,1 thousand rubles. Find the average salary.

$$Decision: \frac{3 + 3{,}2 + 3{,}3 + 3{,}5 + 3{,}8 + 3{,}1}{6} = 3{,}32 \text{ thousand rubles.}$$

TASKS FOR SELF-ACCESS WORK

Option 1. Body weight (in kg) of 6 men who underwent a preventive medical examination when applying for a job: 65, 80, 74, 93, 70, 102. Make a simple variational series and calculate a simple arithmetic average.

Option 2. Pulse rate (beats per minute) at rest in 7 athletes who are engaged in athletics: 68, 70, 65, 75, 72, 65. Make a simple variational series and calculate a simple arithmetic average.

Option 3. The number of patients who are at the dispensary with general practitioners: 122, 134, 131, 127, 143, 148, 129. Make a simple variational series and calculate a simple arithmetic average.

Option 4. The number of appeals with injuries to a trauma center in the city in the first week of the month: 127, 145, 142, 134, 128, 132, 124. Make a simple variation series and calculate a simple arithmetic average.

PRACTICAL SKILL № 5

COMPILING A SIMPLE VARIATIONAL SERIES WITH A LARGE NUMBER OF OBSERVATIONS (>30) AND CALCULATION OF THE WEIGHTED AVERAGE

If the volume of the data set is large and represents a distribution series, a weighted arithmetic mean is calculated. So determine the weighted average price per unit of production: the total cost of production (the sum of the products of its quantity per unit price) is divided by the total number of products.

Let's imagine this as the following formula:

$$x = \frac{\sum x_i w_i}{\sum w_i},$$

where:

x_i – unit price;

w_i – the amount (volume) of the products.

Weighted average is equal to the ratio (the sum of the products of the characteristic value to the repetition rate of this characteristic) to (the sum of the frequencies of all the characteristics).It is used when variants of the studied population meet unequal number of times.

Example. In the variation series of systolic blood pressure measured in ten patients: 110, 120, 120, 130, 130, 130, 140, 140, 160, 170;

the options are only 6 values: 110, 120, 130, 140, 160, 170.

Frequency – a number indicating how many times the variant is repeated. The sum of all frequencies (which, of course, is equal to the number of all studied) is denoted as n.

In our example, the frequencies will take the following values:

- for variants 110, the frequency P = 1 (a value of 110 occurs in one patient),
- for options 120, the frequency of P = 2 (a value of 120 occurs in two patients),
- for variants 130, the frequency P = 3 (a value of 130 occurs in three patients),
- for variants 140, the frequency P = 2 (the value 140 occurs in two patients),
- for variants 160, the frequency P = 1 (the value 160 occurs in one patient),
- for options 170, the frequency P = 1 (170 value occurs in one patient).

Example. Find the average salary of the workers of the shop for the month

Salary per worker, thousand rubles; X	***Number of workers, F***
3,2	20
3,3	35

3,4	14
4,0	6
Total:	75

The average wage can be obtained by dividing the total wage by the total number of workers:

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i f_i}{\sum_{i=1}^{n} f_i} = \frac{x_1 f_1 + x_2 f_2 + \ldots + x_n f_n}{f_1 + f_2 + \ldots + f_n} = \frac{64{,}0 + 115{,}5 + 47{,}6 + 24{,}0}{20 + 35 + 14 + 6}$$

$$= \frac{251{,}1}{75} = 3{,}35$$

Answer: 3,35 thousand rubles.

Mode is another average value of the variation series corresponding to the most frequently repeated variant. Or, to put it another way, this is the option that corresponds to the highest frequency. Denoted as *Mo*. The mod is calculated only for weighted series, since in simple series none of the variants is repeated and all frequencies are equal to one.

For example, in a variation series of heart rate values:

80, 84, 84, 86, 86, 86, 90, 94; the value of the mode is 86, since this variant occurs 3 times, therefore its frequency is the highest.

Median – the value of the variants dividing the variation series in half: on both sides of it there is an equal number of variant. The median, as well as the arithmetic mean and the mode, refers to the averages. Referred to as *Me*.

TASKS FOR SELF-ACCESS WORK

Option 1. Pulse rate (beats per minute) in 35 males at the age of 50**:** 65, 78, 62, 64, 71, 75, 80, 64, 73, 72, 69, 78, 65, 67, 66, 65, 73, 68 , 65, 72, 75, 82, 67, 64, 61, 67, 77, 79, 68, 63, 64, 67, 70, 73, 75. Make up a simple variational series, determine the mode, the median and calculate the weighted arithmetic average.

Option 2. The duration of treatment (in days) in 32 inpatients diagnosed with Acute lobar pneumonia**:** 14, 21, 24, 27, 25, 22, 21, 20, 16, 14, 12, 13, 15, 18, 21, 14, 24, 18, 17, 22, 14, 16, 13, 12, 15, 12, 12, 14, 16, 19, 22, 17. Make a simple variational series, determine the mode, the median and calculate the weighted arithmetic average.

Option 3. Body length in 33 newborn girls (in cm)**:** 53, 48, 49, 54, 53, 51, 47, 49, 50, 54, 50, 53, 49, 49, 50, 49, 54, 55, 49, 52 , 49, 54, 48, 56, 55, 48, 47, 50, 51, 47, 52, 54, 49. Make a simple variational series, determine the mode, the median and calculate the weighted arithmetic average.

Option 4. Body temperature in 32 inpatients of the rheumatology department**:** 37.4; 36.6; 36.9; 37.1; 38.2; 37.7; 37.4; 37.8; 38.1; 38.3; 37.9; 36.6; 36.5; 36.9; 37.7; 37.8; 36.4; 36.6; 36.8; 36.6; 38.5; 37.8; 37.4; 38.2; 38.4; 39.2; 36.6; 37.8; 36.4; 37.4; 37.5; 36.2. Make a simple variational series, determine the mode, the median and calculate the weighted arithmetic average.

PRACTICAL SKILL № 6

CALCULATION, ANALYSIS AND ASSESSMENT OF THE PERFORMANCE OF THE DYNAMIC SERIES (THE ABSOLUTE INCREASE OR DECREASE IN NUMBER, THE RATE OF INCREASE OR DECREASE, THE RATE OF GROWTH OR DECLINE, A VALUE OF 1% OF GROWTH OR DECLINE OF A SERIES) CHARACTERIZING THE HEALTH STATUS OF THE POPULATION OF THE REGION

The change of socio-economic phenomena in time is studied by statistics method of construction and analysis of time series. Series of dynamics are the values of statistical indicators, which are presented in a certain chronological sequence.

Each dynamic series contains 2 components:

1. indicators of time periods (years, quarters, months, days or dates);
2. indicators that characterize the object under study over time periods or as at the respective dates, which are called levels of the series.

Series levels are expressed as absolute, average or relative values. Depending on the nature of the indicators build dynamic series of absolute, relative and average values. Series of dynamics of the relative and average values are based on derived series of absolute values. Distinguish between interval and state series.

The dynamic interval series contains values of indicators for certain periods of time. In the interval series, the levels can be summarized to obtain the volume of the phenomenon for a longer period, or the so-called accumulated results.

Dynamic torque series reflects the values of indicators at a certain time (date time). In the moment series, the researcher may be interested only in the difference of phenomena, reflecting the change in the level of the series between certain dates, since the sum of the levels here has no real content. Accumulated results are not calculated here.

The most important condition for the correct construction of dynamic series is the comparability of series levels related to different periods. Levels should be presented in homogeneous quantities, there should be the same completeness of coverage of different parts of the phenomenon.

In order to avoid distortion of real dynamics, preliminary calculations (closing of time series) are carried out in the statistical study, which precede the statistical analysis of time series. By closing the series of dynamics is meant the Union in one row of two or more series, the levels of which are calculated by different methodology or do not correspond to the territorial boundaries, etc. Closing the series of dynamics may also involve bringing the absolute levels of

the series of dynamics to a common ground, which eliminates the disparity of the levels of the series of dynamics.

Indicators of changes in the levels of dynamic series

To characterize the intensity of development over time, the statistical indicators obtained by comparing the levels with each other are used, resulting in a system of absolute and relative dynamics indicators: absolute growth, growth rate, growth rate, absolute value of 1% growth. To characterize the intensity of development over a long period, average indicators are calculated: the average level of the series, the average absolute growth, the average growth rate, the average growth rate, the average absolute value of 1% growth.

If the study is necessary to compare several successive levels, it is possible to obtain either a comparison with a constant base (basic indicators), or a comparison with a variable base (chain indicators).

Basic indicators characterize the final result of all changes in the levels of the series from the period of the basic level to this (*i-th*) period.

Chain indicators characterize intensity of change of level from one period to another within that period of time which is investigated.

To analyze the dynamic series, it is best to draw it graphically. The ***dynamic line*** can be subjected to transformations, the purpose of which is to identify the characteristics of the studied process, as well as to achieve clarity in the characteristic of a phenomenon.

To determine the trend of the phenomenon under study, the following indicators of the dynamic line are calculated:

Absolute increase (decrease) is the difference between the next and the previous level (measured in the same units in which the series levels are represented).

$$Absolute\ increase\ =\ Next\ level - Previous\ level$$

The rate of increase (decrease) is the ratio of the absolute increase (decrease) of each subsequent level to the previous one, taken as 100%. The growth rate shows how many percent increased (decreased) the subsequent level compared to the previous one.

$$Rate\ of\ increase\ =\ \frac{Absolute\ increase}{Previous\ level} *\ 100\ \%;$$

The growth rate (decrease) is the ratio of each subsequent level to the previous one taken as 100%, i.e. the growth rate shows how many percent of the previous level is the next level.

$$Growth\ rate\ =\frac{Next\ level}{Previous\ level}\ \times 100\%;$$

The absolute value of 1% growth is the ratio of absolute growth (loss) to the growth rate.

$$The\ absolute\ value\ of\ 1\%\ increase\ = \frac{Absolute\ increase}{Growth\ rate}.$$

Example of the calculation of the indicators:

Years	***Morbidity rate (per 100,000 population)***
2006	2,0
2007	1,5
2008	2,3
2009	1,8
2010	2,0
2011	2,5
2012	2,2
2013	2,8
2014	2,0
2015	2,9

Calculate the performance of the dynamic series.

The absolute increase (decrease) is calculated as the difference between the next and the previous level.

Example of calculation for 2007: 1.5-2 = −0.5.

The rate of increase (decrease) is calculated as the ratio of absolute growth (loss) of each subsequent level to the previous one, taken as 100%.

$$Example\ of\ calculation\ for\ 2007: \frac{(-0{,}5)}{2} \times 100\% = -25\%.$$

The growth rate (decrease) is calculated as the ratio of each subsequent level to the previous one, taken as 100%.

$$Example\ of\ calculation\ for\ 2007: \frac{1{,}5}{2} \times 100\% = 75\%.$$

The absolute value of 1% growth (loss) is calculated as the ratio of absolute growth (loss) to the growth rate.

$$Example\ of\ calculation\ for\ 2007: \frac{(-0{,}5)}{(-25)} = 0{,}02.$$

TASKS FOR SELF-ACCESS WORK

Option 1. Birth rate in the country (per 1000 population): 2014 – 9,0; 2015 – 9,1; 2016 – 9,3; 2017 – 9,9; 2018 – 10,5. Calculate the performance of the dynamic series and make a conclusion.

Option 2. Infant mortality in the country (per 100 live births): 2014 – 7,7; 2015 – 6,9; 2016 – 7,1; 2017 – 6,1; 2018 – 5,2. Calculate the performance of the dynamic series and make a conclusion.

Option 3. The number of resident population in the country at the beginning of the year (thous.): 2014 – 9850,2; 2015 – 9720,3; 2016 – 9750,5; 2017 – 9690,6; 2018 – 9698,7. Calculate the performance of the dynamic series and make a conclusion.

Option 4. Number of diagnostic cents in the country: 2014 – 24; 2015 – 26; 2016 – 22; 2017 – 25; 2018 – 29. Calculate the performance of the dynamic series and make a conclusion.

PRACTICAL SKILL № 7

ALIGNMENT METHODS OF DYNAMIC SERIES: INTEGRATION INTERVAL OF DYNAMIC SERIES, CALCULATION OF THE GROUP AVERAGE, CALCULATION THE MOVING AVERAGE

To determine the regularities and the General trend of the phenomenon, mechanical and analytical methods of alignment (smoothing) of the series are used. The main methods can be the consolidation of intervals, the calculation of the group and moving average, bringing the series to one base, alignment by the method of least squares (analytical line).

Consolidation of periods is used when the phenomenon in the interval series is expressed in absolute values, the levels of which are summed over larger periods. Application is possible with a multiple number of periods.

Group average calculation – used when the levels of the interval series are expressed in absolute, average or relative values, which are summed and then divided by the number of terms. The method is used for a multiple of the number of periods.

Moving average calculation is used when the levels of phenomena of any series are expressed in absolute, average or relative values. This method is used in the presence of a non-multiple number of time periods (7, 11, 13, 17, 19) quite a long dynamic range. By calculating the group average of 3 periods, and then moving to a certain level and two adjacent to it, the "sliding" by periods is carried out. Each level is replaced by an average value (from this level and two adjacent to it). This method is used when no special accuracy is required, when there is a sufficiently long series and the loss of two series values can be neglected; in cases when the development of the phenomenon under the influence of one or two factors is studied. Bringing the series to one base is to calculate the indicators of visibility.

Example. Morbidity with temporary disability at one of the industrial enterprises was (in cases per 100 workers):

<table>
<tr><th>Year</th><th>Cases per 100 working</th><th>Periods consolidation (for 2 years)</th><th>Group average</th><th>Moving average (for 3 years)</th></tr>
<tr><td>2010</td><td>110,0</td><td rowspan="2">110,0+90,0=200,0</td><td rowspan="2">$\frac{200,0}{2} = 100,0$</td><td>-</td></tr>
<tr><td>2011</td><td>90,0</td><td>$\frac{110+90+95}{3} = \frac{295}{3} = 95,0$</td></tr>
<tr><td>2012</td><td>95,0</td><td rowspan="2">95,0+90,0=185,0</td><td rowspan="2">$\frac{185,0}{2} = 92,5$</td><td>$\frac{90+95+90}{3} = 91,6$</td></tr>
<tr><td>2013</td><td>90,0</td><td>$\frac{95+90+92}{3} = 92,3$</td></tr>
</table>

2014	92,0	92,0+90,0=182,0	$\frac{182,0}{2}$ = 91,0	$\frac{90+92+90}{3}$ = 90,6
2015	90,0			$\frac{92+90+84}{3}$ = 88,6
2016	84,0	84,0+91,0=175,0	$\frac{175,0}{2}$ = 87,5	$\frac{90+84+91}{3}$ = 88,3
2017	91,0			-

TASKS FOR SELF-ACCESS WORK

Option 1. In the city N the incidence of chickenpox for 10 years has been studied (see table). Align dynamic series.

Morbidity of chickenpox for 10 years (per 10,000 population)

Years	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Index	3,5	4,9	3,6	5,7	6,5	5,5	8,1	7,2	5,0	7,3

Option 2. In the city A the incidence of flu for 10 years has been studied (see table). Align dynamic series.

Morbidity of flu for 10 years (per 10,000 population)

Years	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Index	5,5	5,9	4,6	6,7	6,9	5,9	7,9	7,2	5,8	7,4

Option 3. In the city B the incidence of tonsillitis for 10 years has been studied (see table). Align dynamic series.

Morbidity of tonsillitis for 10 years (per 10,000 population)

Years	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Index	2,4	3,8	3,5	5,6	5,5	4,9	6,1	6,3	5,6	6,4

Option 4. In the city C the incidence of scarlet fever for 10 years has been studied (see table). Align dynamic series.

Morbidity of scarlet fever for 10 years (per 10,000 population)

Years	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Index	1,9	2,7	2,6	2,2	3,5	3,4	2,1	3,2	3,6	2,5

PRACTICAL SKILL № 8

TO ASSESS THE RELIABILITY OF THE DIFFERENCE BETWEEN TWO RELATIVE AND AVERAGE VALUES

The method of estimation of reliability of difference of indicators or averages allows to establish, whether the revealed distinctions are essential, or they are result of action of the casual reasons.

The method is based on the definition of the criterion of reliability (*t*), which is calculated by special formulas for the mean and relative values. The formula for calculating the criterion of reliability (*t*) difference:

for averages:

$$t = \frac{M_1 - M_2}{\sqrt{m_1^2 + m_2^2}}$$

for relative values:

$$t = \frac{P_1 - P_2}{\sqrt{m_1^2 + +m_2^2}}$$

where:

t is the reliability coefficient;

M_1 and M_2, P_1 and P_2 are the statistical values obtained during the sample studies;

m_1 and m_2 – its representativeness errors.

When studying the phenomenon on a large sample, the difference is significant at $\boldsymbol{t \geq 2}$, which corresponds to the probability of an error-free forecast of ***95.5%*** (at n>30).

At $\boldsymbol{t \geq 3}$, the differences between the compared values are reliable with the probability of error – free forecast of ***99.7%***.

In most medical studies, it is sufficient to have a value of *t* equal to or greater than ***1.96***. Then the revealed differences are reliable, not random, statistically confirmed with probability of error – free forecast equal or more than ***95%***.

When the value of the validity coefficient *t* of ***1.96*** probability of the faultless forecast of ***95%***.

With such a degree of probability of an error – free forecast, the difference between the compared indicators is unreliable.

In this case, it is necessary to obtain additional data by increasing the number of observations. If after increasing the sample size, and, accordingly, reducing the error of representativeness, the difference continues to be unreliable, it can be considered proved that there are no differences between the compared populations on the studied basis.

To determine the reliability of the differences between the two indicators or the average values for a small number of observations ($n \leq 30$, in each group), the reliability criterion is estimated from the table of t student criterion values by the number of degrees of freedom. The number of degrees of freedom is defined as the sum of the number of observations in each group without two ($n = n_1 + n_2 - 2$).

The method of assessing the reliability of indicators and averages is widely used in clinical and statistical studies, in the comparative analysis of data on the effectiveness of various methods of diagnosis and treatment. It is necessary when comparing the data in dynamics, by departments, sites, patients, etc. Use of this method is appropriate in assessing the differences in the levels of morbidity, mortality, mortality, the average duration of treatment, the frequency of postoperative complications, the effectiveness of clinical examination and other intensive indicators and averages. This method of estimation of reliability is not recommended to be applied at the analysis of distribution indicators (extensive indicators, indicators of specific weight) since their size depends on the ratio of components in sets and to draw a conclusion about existence or absence of differences on the basis of extensive indicators it is impossible.

The method of assessing the reliability of the ***t-criterion (Student's method)*** is used when comparing two values. If it is necessary to compare more objects, groups of supervision, apply other methods.

TASKS FOR SELF-ACCESS WORK

Option 1. In 2017, the average duration of treatment of patients with mental disorders and behavioral disorders in hospitals of the N-th area was 20.9 ($m_1 = \pm 0.02$) days, with respiratory diseases 9.9 ($m_2 = \pm 0.09$) days. To determine the reliability of the difference in the average duration of treatment in the compared groups and to conclude.

Option 2. In 2018, the average duration of treatment of patients with diseases of the nervous system in the N-th area was 11.8 ($m_1 = \pm 0.05$) days, with diseases of the circulatory system 12.2 ($m_2 = \pm 0.09$) days. To determine the reliability of the difference in the average duration of treatment in the compared groups and to conclude.

Option 3. When studying the average duration of treatment for adults and children in the infectious diseases department, the following data were obtained: the average duration of treatment for adults is 13.4 days ($m_1 = \pm 0.05$); children – 16.4 days ($m_2 = \pm 0.08$). To determine the reliability of the difference in the average duration of treatment in the compared groups and to conclude.

Option 4. When studying the average age of the population in two districts of the region, the following data was obtained: the average age of the population in area A was 52 ($m_1 = \pm 0.03$) years, in area B – 40.5 ($m_2 = \pm 0.05$) years. To determine the reliability of the difference in the average age in the compared groups and to conclude.

PRACTICAL SKILL № 9

MEDICAL DEMOGRAPHY. CALCULATION OF NATURAL MOVEMENT INDICATORS OF THE POPULATION (GENERAL COFFICIENT OF FERTILITY, SPECIAL COEFFICIENT OF FERTILITY, GENERAL COEFFICIENT OF MORTALITY, NATURAL GROWTH COEFFICIENT, MECHANICAL GROWTH COEFFICIENT)

High mortality in the world is associated with a steady trend of increasing morbidity. In comparison with developed countries, the diseases of people in our country become chronic for 15–20 years, which leads to mass disability and premature mortality.

The statistics are disappointing: a significant part of the population leads an unhealthy lifestyle: poor diet, consumption of bad water, mass neglect of physical culture, drunkenness and alcoholism, smoking, drugs and so on. Availability of quality medical care is at an unacceptably low level. To get an appointment with many doctors, people need to endure long lines. Public funds in the budgets of all levels are significantly lower than in the developed countries of the world, only 3-4% of GDP, at a rate of 7%.

Most of all, unqualified management destroys the health of employees. It is known that almost half of people come to work with various ailments, unstable pressure, heart failure. When employers set a task for an employee to achieve some results, he often literally and figuratively “sweats”, “emits” and “heats up”. All this undermines the nervous system, there are various serious diseases.

The demographic "cross" and constant stresses affect the development of the economy and the quality of life of the population.

Population movement is the change in population as a result of birth and death.

Natural population growth is the absolute value of the difference between the numbers of births and deaths over a certain period of time. Its value can be both positive and negative.

The birth and death rates are common – the ratio, respectively, of the number of births (live) and the number of deaths during a calendar year to the average annual population. Calculated in ppm (per 1000 population).

The natural growth coefficient is the difference between the total birth and death rates.

Formulas for calculating indicators of natural population movement:

1. ***The total fertility rate*** is found as a ratio of the number of births to the average annual population:

$$C_f = \frac{N_p}{N}$$

Where N_p – number of births,
N – average annual population.

2. The special fertility rate can be found as the ratio of the number of births to the number of women of reproductive age (15-49 years old) or as the ratio of the overall birth rate to the proportion of women of reproductive age in the entire population:

$$f = \frac{C_f}{d^F}$$

Where d^F – proportion of women of reproductive age in the total population.

3. The overall mortality rate is the ratio of the number of deaths to the average annual population:

$$C_m = \frac{N_c}{N}$$

Where N_c – death toll.

4. Natural growth coefficient will be equal to the difference between the birth rate and death rate:

$C_{nat} = C_f - C_m$

5. Mechanical growth coefficient will be equal to the ratio of mechanical growth to the average annual population:

$$C_m = \frac{\Delta_M}{N} \times 1000$$

Example. The average annual population in the region in 2015 was 18 million people, of which 25% are women aged 15-49 years. During the year, 25,000 people were born in the region, 12,000 people died, including 850 children under 1 year, 16,000 people arrived in the region for permanent residence, 10,000 people left the region for permanent residence outside the region.

Identify: total fertility rate, special fertility rate (fertility rate), total mortality rate, natural growth coefficient, mechanical growth coefficient.

1. *Total fertility rate:*

$$C_f = \frac{25000}{18000000} \times 1000 = 1{,}4‰$$

Thus, for every thousand people in the region's population, 1.4 people were born.

2. *Special fertility rate:*

$$f = \frac{1{,}4‰}{25\%} = 0{,}056$$

3. *The overall mortality rate is the ratio of the number of deaths to the average annual population:*

$$C_m = \frac{1200}{18000000} \times 1000 = 0{,}7‰$$

Thus, for every thousand people in the population, 0.7 people died.

4. *Natural growth coefficient:*

$C_{nat} = 1{,}4 – 0{,}7 = 0{,}7$

Per one thousand people of the population the natural increase was 0.7 people.

5. *Mechanical growth coefficient:*

$$C_m = \frac{16000 - 10000}{18000000} \times 1000 = 0{,}3‰$$

Mechanical growth per thousand people was 0.3 people.

TASKS FOR SELF-ACCESS WORK

Option 1. In 2017, the average annual population in the region was 16 million, of which 20% are women aged 15-49. During the year, 22,000 people were born in the region, 11,000 people died, including 800 children under one year, 15,000 people arrived in the region for permanent residence, and 10,500 persons left the region for permanent residence outside the region.

Calculate natural movement indicators of the population: total fertility rate, special fertility rate, total mortality rate, natural growth coefficient, mechanical growth coefficient.

Option 2. The average annual population in the region in 2015 was 17 million people, of which 25% are women aged 15-49 years. During the year, 23,000 people were born in the region, 13,000 people died, including 900 children under the age of 1 year, 17,000 people arrived in the region for permanent residence, 12,000 people left the region for permanent residence outside the region.

Calculate natural movement indicators of the population: total fertility rate, special fertility rate, total mortality rate, natural growth coefficient, mechanical growth coefficient.

Option 3. The average annual population in the region in 2016 was 19 million people, of which 30% are women aged 15-49 years. During the year, 24,000 people were born in the region, 12,000 people died, including 850 children under 1 year, 16,000 people arrived in the region for permanent residence, 10,000 people left the region for permanent residence outside the region.

Calculate natural movement indicators of the population: total fertility rate, special fertility rate, total mortality rate, natural growth coefficient, mechanical growth coefficient.

Option 4. The average annual population in the region in 2018 was 17.5 million people, of which 25% are women aged 15-49 years. During the year, 25,000 people were born in the region, 13,000 people died, including 950 children under one year old, 17,000 people arrived in the region for permanent residence, 11,000 people left the region for permanent residence outside the region.

Calculate natural movement indicators of the population: total fertility rate, special fertility rate, total mortality rate, natural growth coefficient, mechanical growth coefficient.

PRACTICAL SKILL № 10

CALCULATION, ANALYSIS AND ASSESSMENT OF INDICATORS OF CHILDREN MORTALITY OF POPULATION: INFANT MORTALITY; NEONATAL MORTALITY; EARLY NEONATAL MORTALITY, LATE NEONATAL MORTALITY; POST-NEONATAL MORTALITY; PERINATAL MORTALITY; STILLBIRTHS; INFANT MORTALITY STRUCTURE

Child mortality rates characterize not only the state of health of the child population, but also the level of socio-economic well-being of society as a whole. Correct and timely analysis of child mortality allows to develop a number of specific measures to improve the health of pregnant women and children, to assess the effectiveness of preventive measures, the work of local health authorities for the protection of motherhood and childhood.

Infant mortality characterizes the death of newborns from birth to the age of one. It stands out from the General problem of mortality due to the special social importance. Its level is used to assess the health of the population as a whole, social well-being, the quality of treatment and preventive care for women and children.

Documents for registration of infant mortality are "Medical certificate of death" and "Medical certificate of perinatal death".

The analysis of infant mortality includes:

1) infant mortality per calendar year;
2) infant mortality by month of the calendar year;
3) infant mortality in the first year of life;
4) infant mortality rates from this cause.

Since the number of children who died may be born in either the current or the previous calendar year, and the number of children born is usually different, there are formulas for a more accurate calculation of infant mortality.

The infant mortality rate is specified by its analysis for the first year of life. The level and causes of infant mortality vary from one period of life to the next.

The death of children in the first year of life is unevenly distributed over different age periods. The highest rates of deaths were observed on the first day after birth, but then sharply, and then more gradually, there is a decrease with each passing day, week and month.

According to the periods of the first year of life, the following infant mortality rates are distinguished:

1) early neonatal mortality (death of children in the first week of life);
2) neonatal mortality (death of children in the first month of life);
3) late neonatal mortality (death from the 7th to the 27th day of life);

4) *post-neonatal mortality (death of children over the age of one month before the execution of one year of life).*

Indicators characterizing the mortality of the child population:

1. Infant mortality is the indicator of the frequency of deaths of children in the first year of life. It can be calculated in three ways:

a) *Infant (child) mortality =*

$$\frac{\text{Number of children who died on the 1st year of life}}{\text{Number of children born alive during the year}} \times 1000;$$

b) *Infant (child) mortality =*

$$\frac{\text{Number of children who died on the 1st year of life}}{\frac{2}{3}\text{ of the children born alive for the year of calculation} + \frac{1}{3}\text{ of the children born in the previous year}} \times 1000;$$

c) *Infant (child) mortality =*

$$\frac{\text{Number of children who died on the 1st year of life}}{\frac{4}{5}\text{ of the children born alive for the year of calculation} + \frac{1}{5}\text{ of the children born in the previous year}} \times 1000.$$

2. Mortality rate of newborns (neonatal mortality) =

$$\frac{\text{Number of children who died at 1 month of life } (0-27 \text{ days})}{\text{Number of children born alive during the year}} \times 1000.$$

3. Indicator of early neonatal mortality =

$$\frac{\text{Number of children who died at 1 week of life } (0-6 \text{ days}}{\text{Number of children born alive during the year}} \times 1000.$$

4. Indicator of late neonatal mortality =

$$\frac{\text{Number of children who died at 1 month of life } (7-27 \text{ days})}{\text{Number of children born alive} - \text{dead } (0-6 \text{ days})} \times 1000.$$

5. Index post-neonatal mortality rate =

$$\frac{\text{Number of children who died from 28 to 364 days}}{\text{Number of children born alive – dead (0–27 days)}} \times 1000.$$

6. Rate of perinatal mortality =

$$\frac{\text{Number of stillborn + number of dead children at the 1st week of life (0–6 days)}}{\text{Number of children born alive and dead in a year}} \times 1000.$$

Stillbirth rate is the birth or removal from the mother's body of the fetus at the time of pregnancy from 28 weeks or more, which after separation from the mother's body did not make a single breath, i.e., which has no independent pulmonary breathing at birth and when trying to revive (regardless of the presence of heartbeat or other signs of life). The index of stillbirth is expressed in per mil (‰) and are calculated according to the formula:

$$\frac{Number\ of\ children\ born\ dead}{Number\ of\ all\ children\ born\ (living\ and\ dead)} \times 1000$$

Similarly, the rates of stillbirths of full-term and premature infants are calculated (premature infants are 7-8 times more likely to be born dead). The stillbirth rate for countries ranges from 5 to 20‰ (the lowest in economically developed countries).

The causes of stillbirth are various: complications of pregnancy (late toxicosis, bleeding, etc.), abnormalities of labor and fetal position, pathology of the umbilical cord and placenta, maternal diseases (heart disease, hypertension, diabetes, infectious diseases, etc.). Depending on the time of death in relation to childbirth, stillbirths are divided into antenatal (in the case of fetal death between the 28th week of pregnancy and the beginning of childbirth) and intranatal (in the case of fetal death during childbirth).

The main direct causes of:

antenatal stillbirth – asphyxia, hemolytic disease, intrauterine infection, congenital malformations, genetic diseases;

intranatal stillbirth – pathological course of labor (intracranial birth trauma, fetal asphyxia, mother's eclampsia, etc.).

TASKS FOR SELF-ACCESS WORK

Option 1. In the city A, 1080 children were born in the reporting year, 1,650 people died, including 10 children under the age of 1 year (8 of them under the age of 1 month and 5 in the first week of life). Deathborns gave birth to 7 children. Calculate the death rates of children of the first year of life and compare with the data of last year. Make a conclusion.

Demographic indicators of the previous year in the city of N:

Index	***Value of the indicator***
Number of births	1056 people
Infant mortality	13‰
Perinatal mortality	10,6‰
Neonatal death	7,3‰
Stillbirth	4,6‰

Option 2. In the city of B in the reporting year, 1095 children were born, 1,755 people died, including 9 under the age of 1 year (7 of them under the age of 1 month and 4 in the first week of life). Deadborn born 5 children. Calculate the death rates of children of the first year of life and compare with the data of last year. Make a conclusion.

Demographic indicators of the previous year in the city of N:

Index	***Value of the indicator***
Number of births	1060 people
Infant mortality	12‰
Perinatal mortality	11,5‰
Neonatal death	7,5‰
Stillbirth	4,5‰

Option 3. In the city of C in the reporting year, 1,100 children were born, 1,880 people died, including 11 (under the age of 1 month, 9 of them, and 4 in the first week of life). Deadborn born 6 children. Calculate the death rates of children of the first year of life and compare with the data of last year. Make a conclusion.

Demographic indicators of the previous year in the city of N:

Index	***Value of the indicator***
Number of births	1055 people
Infant mortality	13‰
Perinatal mortality	10,8‰
Neonatal death	7,1‰
Stillbirth	4,2‰

Option 4. In the city of N in the reporting year, 1,150 children were born, 1,750 people died, including 8 under the age of 1 year (6 of them under the age of 1 month and 3 in the first week of life). Deadborn born 5 children. Calculate the death rates of children of the first year of life and compare with the data of last year. Make a conclusion.

Demographic indicators of the previous year in the city of N:

Index	***Value of the indicator***
Number of births	1090 people
Infant mortality	11‰
Perinatal mortality	11,1‰
Neonatal death	7,7‰
Stillbirth	4,4‰

PRACTICAL SKILL № 11

CALCULATION, ANALYSIS AND EVALUATION OF INDICATORS ACCORDING TO THE APPEALABILITY OF POPULATION FOR MEDICAL CARE: PRIMARY MORBIDITY; GENERAL MORBIDITY; INFECTIOUS MORBIDITY; HOSPITALIZED MORBIDITY; THE INCIDENCE OF MAJOR NON-EPIDEMIC INFECTIONS

Morbidity rates are calculated on the basis of primary data. Some other additional indicators are also calculated. Sometimes, to identify the causes of morbidity in the study region and confirm the relationship between diseases and environmental problems, additional studies can be carried out, in which specific diseases are studied, etiologically related to the nature of contamination of the territory: genetic disorders, namely, an increase in the frequency of genetic disorders in human cells (chromosomal aberrations, DNA breaks, etc.).); the content of toxic chemicals in human biosubstrates (blood, urine, hair, teeth, saliva, placenta, women's milk, etc.) exceeding the permissible biological levels; change in immune status: an increase in the number of people with pronounced shifts in the immunogram by morphological and humoral parameters.

Indicators can be calculated as the ratio of the number of persons (taking into account the number of persons, for example, first applied for treatment, the injured, the dead, etc.), and in respect of the number of cases (i.e. number of cases in a medical facility).

Primary morbidity, i.e. the frequency of newly diagnosed diseases, is the collection of newly diagnosed diseases over a period of time, for example, one year. The primary incidence of I_{fr} is defined as the ratio of the number of newly registered N_{fr} patients or the number of newly diagnosed diseases to the average population of *n* per 100000 people:

$$I_{fr} = \frac{N_{fr}}{N} \times 100000$$

The same formula is used to calculate the total morbidity (P_m). It takes into account all diseases (acute, chronic, new and previously registered) of the population for a certain period, for example, for the year (N_m):

$$P_m = \frac{N_m}{N} \times 100000$$

Total morbidity – the totality of all existing diseases among the population, first identified in a given year and registered in previous years, about which patients again turned in a given year, per 100000 people.

The overall cumulative incidence – the number of diseases registered in the last year, complemented by cases of chronic illness in the previous 2 years and in respect of which no application has been filed in a given year per 1,000 population.

Similarly, the calculated pathological prevalence or frequency of diseases identified during the inspection. This includes those diseases that are registered in the population on a certain date (the contingent of patients on a certain date).

The structure of S_i prevalence of diseases determines the share (percentage) of patients with a specific nosological form in the total number of registered patients. It is defined as the ratio of the number of N_i registered patients with the I-th nosological form to the number of registered patients with N_r:

$$S_i = \frac{N_i}{N_r} \times 100\%$$

Infectious morbidity. If an infectious disease is detected, the doctor of any specialty is obliged to fill in the "Emergency notice of an infectious disease, food, acute occupational poisoning, unusual reaction to the vaccination" and send it within 12 hours to the territorial center of hygiene, epidemiology and public health at the place of registration of the disease (regardless of the place of residence of the patient). The emergency notice is registered in the *"Register of infectious diseases"*. The analysis of indicators of epidemic morbidity is carried out in the medical and preventive organizations on the basis of *"Report on the movement of infectious diseases"*. The centers for hygiene and epidemiology and public health produce monthly and annual reports on the movement of infectious diseases.

The name of the indicator	***The method of calculating***
Infectious morbidity	$\frac{\text{Number of identified infectious diseases}}{\text{Mid} - \text{year population}} \times 10{,}000$
Frequency of hospitalization of infectious patients	$\frac{\text{Number of admitted patients with infectious diseases}}{\text{Mid} - \text{year population}} \times 1{,}000$
Coverage of hospitalization of infectious patients	$\frac{\text{Number of admitted patients with infectious diseases}}{\text{Number of identified infectious patients}} \times 100$
Focality	$\frac{\text{Number of detected infectious patients with this disease}}{\text{Number of foci of this infectious disease}}$
The structure of infectious diseases (in %)	$\frac{\text{Number of cases of diseases with one nosological form}}{\text{Number of cases of all infectious diseases}} \times 100$

The frequency of infectious diseases (in General, for individual diseases)	$\frac{\text{Number of cases of infectious diseases}}{\text{Average annual population living in the area}} \times 1{,}000$
Mortality from infectious diseases	$\frac{\text{Number of deaths from infectious diseases}}{\text{Average annual population}} \times 100{,}000$

The morbidity of the most important non-epidemic diseases is studied by *"Notifications of a patient with a first-ever diagnosis of active tuberculosis, venereal disease, trichophytosis, microsporia, trachoma, cancer and other malignant neoplasms".*

The name of the indicator	***The method of calculating***
The structure of non-epidemic morbidity (in %)	$\frac{\text{Number of cases of one of the nosological forms}}{\text{Number of cases of all non} - \text{epidemic diseases}} \times 100$
The frequency of non-epidemic morbidity (in General, for individual diseases)	$\frac{\text{Number of cases of non} - \text{epidemic diseases}}{\text{Annual average of population living in the area}} \times 1{,}000$

Hospitalized morbidity is registered with the help of the *"Card of the discharged from the hospital".*

The name of the indicator	***The method of calculating***
Frequency of hospitalization	$\frac{\text{Number of hospitalized children per year}}{\text{Average child population}} \times 1{,}000$
Average duration of hospital treatment	$\frac{\text{Number of bed days spent by patients}}{\text{Number of patients used}}$
Seasonality of hospitalization	$\frac{\text{Number of admissions in a given month}}{\text{Number of admissions per year}} \times 100$
Proportion of patients admitted on a given day of the week	$\frac{\text{Number of admissions on a given day of the week (Monday, etc.)}}{\text{Number of admissions per year}} \times 100$
The case-fatality rate	$\frac{\text{Number of deceased patients}}{\text{Number of treated patients}} \times 100$ (Number of treated patients = Discharged patients + deceased patients+ patients transferred to other hospitals)

The completeness of information on morbidity according to the appeal for medical care is influenced by such factors as the availability of medical care, its volume and quality, the level of medical culture of the population, the mandatory registration of detected diseases.

TASKS FOR SELF-ACCESS WORK

Option 1. The city has a population of 700,000 people. In the clinics of the city registered diseases of all nosological forms 688 cases. Of these, 406 cases occurred for the first time. Calculate the prevalence rates, the primary incidence rate, evaluate them with the figures for the last year. The previous year: a total incidence rate of 94,7‰, a primary incidence of 50,2‰.

Option 2. There were 17300 cases of acute and chronic diseases, including angina – 740, hypertension – 190, gastric ulcer and duodenal ulcer – 160. 70 people were hospitalized with hypertension, 3 of them died. The population of the city served by the hospital is 23,200. Calculate the following indicators: General morbidity of the population served by the hospital (per 1000000 population); Incidence of tonsillitis, hypertension, peptic ulcer and 12 duodenal ulcer (per 10,000); The proportion of angina among all diseases (%).

Option 3. The city has a population of 750,500 people. In the clinics of the city registered diseases of all nosological forms 695,800 cases. Of these, 410,500 cases occurred for the first time. Calculate the prevalence rates, the primary incidence rate, evaluate them with the figures for the last year. The previous year: a total incidence rate of 950‰, a primary incidence of 505‰.

Option 4. There were 17300 cases of acute and chronic diseases, including scarlet fever – 730, lobar pneumonia – 185, gastritis – 150. 65 people were hospitalized with lobar pneumonia, of whom 2 died. The population of the city served by the hospital is 22,500. Calculate the following indicators: General morbidity of the population served by the hospital (per 1000 population); The incidence of scarlet fever, lobar pneumonia, gastritis (per 10,000); The proportion of gastritis among all diseases (%).

PRACTICAL SKILL № 12

CALCULATION, ANALYSIS AND EVALUATION OF INDICATORS ACCORDING TO MEDICAL EXAMINATIONS: PATHOLOGICAL PREVALENCE; HEALTH INDEX; POPULATION COVERAGE OF PERIODIC MEDICAL EXAMINATIONS; COVERAGE OF TARGET EXAMINATIONS

Morbidity is one of the criteria for assessing the health status of the population. Materials on the morbidity of the population in the practice of a doctor are necessary for: operational management of health institutions; evaluation of the effectiveness of medical and recreational activities, including medical examination; assessment of public health and identify risk factors that contribute to the reduction of morbidity; planning the volume of preventive examinations; determination of the contingent for dispensary observation, hospitalization, sanatorium treatment, employment of a certain contingent of patients, etc.; current and future planning of personnel, a network of various services and health units; prognosis of morbidity.

In morbidity statistics, there are the following indicators:

Pathological lesions – a set of diseases and pathological conditions identified by doctors through active medical examinations of the population. Basically it is a chronic disease, but can be taken into account and acute diseases that are currently available. In practical health care, this term can be used to define the results of medical examinations of the population:
Formula for calculation:

$$\frac{Number\ of\ diseases\ detected\ during\ medical\ examination}{Number\ of\ examined\ persons} \times 100$$

The health index is the proportion of people who are not sick (who did not seek medical help due to a disease or exacerbation of a chronic disease).
Formula for calculation:

$$\frac{Number\ of\ healthy\ persons\ detected\ during\ medical\ examination}{Number\ of\ examined\ persons} \times 100$$

Completeness of coverage by medical examinations, characterizes quality of preventive work, including quality of dispensary supervision.
Formula for calculation:

$$\frac{Number\ of\ inspected\ persons}{Number\ to\ be\ inspected} \times 100$$

The target population coverage for tuberculosis and syphilis is calculated per 100 population (1,000 population).

Formula for calculation:

$$\frac{\begin{array}{c}Number\ of\ persons\\ examined\ for\ the\ purpose\\ of\ detection\ of\ tuberculosis\ (syphilis)\end{array}}{Population\ of\ the\ area\ of\ service\ of\ policlinic} \times 100$$

TASKS FOR SELF-ACCESS WORK

Option 1. In the city A 1256 observed children aged from 7 to 14 years. The number of children and adolescents who were absolutely not ill for a year in this age group is 295. Calculate the index of health and pathological lesions in the city A in the specified age group.

Option 2. In the city B 3420 observed children aged 0 to 14 years. The number of children and adolescents with chronic diseases and functional disorders for the year 945. Calculate the pathological lesions and health index in the city B in the specified age group.

Option 3. In the city C 3567 observed children aged from 7 to 14 years. The number of children and adolescents who were absolutely not ill for a year in this age group is 768. Calculate the index of health and pathological lesions in the city C in the specified age group.

Option 4. In the city N 1986 observed children aged from 7 to 14 years. The number of children and adolescents who were absolutely not ill for a year in this age group is 301. Calculate the index of health and pathological lesions in the city N in the specified age group.

PRACTICAL SKILL № 13

CALCULATION, ANALYSIS AND ASSESSMENT OF INDICATORS OF MORBIDITY WITH TEMPORARY DISABILITY (MTD): THE NUMBER OF CASES OF DISEASES WITH HLA PER 100 EMPLOYEES, THE NUMBER OF DAYS OF INCAPACITY WITH TD ON 100 WORKING, AVERAGE DURATION OF 1 CASE OF INCAPACITY, THE STRUCTURE OF TD DISEASE INCIDENCE FOR CASES AND BY DAYS

Morbidity with temporary disability, or morbidity of working contingents, is subject to special accounting and analysis. This account is carried out according to sheets of disability. However, in outpatient clinics that use the system of accounting for the completed case of polyclinic services, the collection and formation of statistical information on temporary disability is carried out through the *"Outpatient patient's Card"*.

Workers may be issued a certificate of disability in a medical institution, both at the place of residence and at the place of work, as well as in dispensaries, hospitals, etc.

There are two accounting systems: signal system; system of subsequent accounting.

With the signal system, wherever a sheet of disability was issued to the worker, the attending physician is obliged to immediately report it to the place of work. This can be done by phone or by sending a card. After the worker has recovered, he in a place of work hands over in accounts Department the leaf of disability, and before registers it in a health center of the enterprise.

This is the best, most accurate and absolute record, especially during epidemics, influenza outbreaks. It allows you to immediately take measures to prevent diseases. However, in large cities it is not acceptable.

The most widely used system of follow-up, in which the leaflet of disability at the end of the disease is handed over to the administration of the enterprise, and then this document goes to the trade Union bodies for the preparation of the report ("Report on the causes of temporary disability").

This report is intended for operational purposes of accounting and analysis of temporary disability of workers. For the analysis of morbidity with temporary disability it is accepted to calculate the following indicators.

The unit of observation is each case of temporary disability.

The registration document-the leaf of disability (has not only medical and statistical, but also legal financial value). Recalculation on 100 working.

Main indicators:

1. Number of incapacity for work per 100 employees:

$$\frac{Number\ of\ all\ cases\ of\ disability}{Average\ number\ of\ employees} \times 100.$$

2. Number of days of incapacity for work per 100 employees:

$$\frac{Number\ of\ all\ days\ of\ incapacity\ for\ work}{Average\ number\ of\ employees} \times 100.$$

3. The average duration of one case of incapacity:

$$\frac{Number\ of\ days\ of\ incapacity\ for\ work}{Number\ of\ cases\ of\ incapacity\ for\ work}.$$

4. Structure of morbidity with temporary disability in days:

$$\frac{Number\ of\ days\ of\ disability\ for\ the\ disease}{Total\ number\ of\ days\ of\ disability} \times 100.$$

5. The structure of morbidity with temporary disability in cases of:

$$\frac{Number\ of\ cases\ of\ disability\ for\ the\ disease}{Total\ number\ of\ cases\ of\ disability} \times 100.$$

6. "Health index" is the share of the sick among all workers:

$$\frac{Number\ of\ people\ who\ have\ never\ been\ sick\ in\ a\ given\ year}{Number\ of\ people\ working\ at\ the\ enterprise} \times 100.$$

TASKS FOR SELF-ACCESS WORK

Option 1. Calculate and estimate indicators of morbidity with temporary disability in an industrial enterprise, if it is known that 3200 people work on it. The number of cases is 2,800, the number of days of temporary for work is 29,000.

Option 2. Calculate and evaluate indicators of morbidity with temporary disability in an industrial enterprise, if it is known that 3,800 people work for it. The number of cases of temporary incapacity for work is 1700. The number of days of temporary disability is 32000.

Option 3. Calculate and estimate indicators of morbidity with temporary disability in an industrial enterprise, if it is known that 3,500 people work for it. The number of cases of illness is 2750, the number of days of temporary disability is 28000.

Option 4. Calculate and estimate indicators of morbidity with temporary disability in an industrial enterprise, if it is known that 4,100 people work in it. The number of cases of temporary disability 1950. The number of days of temporary disability is 32600.

PRACTICAL SKILL № 14

CALCULATION, ANALYSIS AND EVALUATION OF INDICATORS ACCORDING ON THE CAUSES OF DEATH: TOTAL MORTALITY, MORTALITY FROM INDIVIDUAL CAUSES; LETHALITY. INJURIES, DISABILITY, CHARACTERIZING THE HEALTH STATUS OF THE POPULATION OF THE REGION

The structure of the causes of death of the population as a whole or its separate groups (sexual, age, professional, etc.) allows to establish the most severe and serious diseases that led to death.

The name of the indicator	***The method of calculating***
Structure of causes of death (in %)	$\frac{\text{Number of deaths by class, one of the nosological forms}}{\text{Number of all deaths}} \times 100$
Mortality of the population (in General, by individual diseases)	$\frac{\text{Number of deaths in General or in individual nosologies}}{\text{Annual average of population living in the territory for a certain period (year)}} \times 1{,}000$

1) $Lethality = \frac{Number\ of\ patients\ who\ died}{Number\ of\ patients\ treated} \times 100$

(Number of patients treated = Discharged patients + deceased patients + patients transferred to other hospitals).

2) Information about the absolute number of injuries make it impossible to assess and even more to compare the state ***traumatism*** at enterprises with different number of employees. Therefore, in practice, use statistical indicators of the frequency and severity of injuries.

As an indicator of the frequency of injuries, the number of injuries per 1000 workers (or workers) for a certain calendar period of time (month, quarter, year) is taken):

$F_i = \frac{T}{P} \times 1000$,

where T – number of injuries during this period;

P – the average number of workers (or workers) in the same period.

Indicators of industrial injuries allow you to compare the state of injuries in various shops, enterprises and industries; identify the most dangerous areas of work that require priority implementation of health measures; determine the

change in the state of health and safety measures; in the first approximation to estimate the cost of compensation for material damage associated with industrial injuries.

3) Analysis of the dynamics of disability in groups allows us to identify positive, negative, stable and variable types of dynamics on the trend of indicators characterizing the increase or decrease in groups.

The name of the indicator	***The method of calculating***
Primary disablement	$\frac{\text{Number of persons first recognized as disabled during the year}}{\text{Total population}} \times 1{,}000$
Structure of primary disability (by disease, sex, age, etc.)	$\frac{\text{Number of persons first recognized as disabled during the year for the disease}}{\text{Total number of persons first recognized as disabled during the year}} \times 1{,}000$
Frequency of primary disability by disability group	$\frac{\text{Number of persons recognized as disabled persons of group I (group II, group III)}}{\text{Total population}} \times 1{,}000$
Structure of primary disability by disability group	$\frac{\text{Number of persons recognized as disabled persons of group I (group II, group III)}}{\text{Total number of persons recognized as disabled for the first time during the year}} \times 100$
General disability (disabled population)	$\frac{\text{Total number of persons with disabilities (number of persons receiving disability pensions, i. e. for the first time and previously recognized as disabled)}}{\text{Total population}} \times 1{,}000$
The change of the disability group in the survey	$\frac{\text{Number of persons in the survey have changed the disability group}}{\text{Number of disabled persons that passed the re} - \text{examination for the year}} \times 100$
Proportion of persons with disabilities who are newly disabled among all persons with disabilities	$\frac{\text{Number of persons newly recognized as disabled during the year}}{\text{Total number of persons with disabilities}} \times 100$
The proportion of disabled children among all persons with disabilities	$\frac{\text{Number of persons newly recognized as disabled from childhood in the course of the year}}{\text{Total number of persons with disabilities}} \times 100$

TASKS FOR SELF-ACCESS WORK

Option 1. In the city of N, the population was 600 thousand people, of which: men – 250 thousand, women – 350 thousand. During the year, 8 thousand people died. Distribution of deaths by causes of death: circulatory system diseases – 3600; malignant neoplasms – 1800; accidents, poisoning and injuries – 2600.

Determine the structure of the population by gender.

Calculate the structure of causes of death.

Calculate the mortality rate for reasons.

To conclude.

Option 2. In the city of N, the population was 700 thousand people, of which: men – 300 thousand, women – 400 thousand. During the year, 9 thousand people died. Distribution of deaths by causes of death: circulatory system diseases – 4400; malignant neoplasms – 1900; accidents, poisoning and injuries – 2700.

Determine the structure of the population by gender.

Calculate the structure of causes of death.

Calculate the mortality rate for reasons.

To conclude.

Option 3. In the city of N, the population was 720 thousand people, of which: men – 290 thousand, women – 430 thousand. During the year, 8 thousand people died. Distribution of deaths by causes of death: circulatory system diseases – 3900; malignant neoplasms – 1900; accidents, poisonings and injuries – 2200.

Determine the structure of the population by gender.

Calculate the structure of causes of death.

Calculate the mortality rate for reasons.

To conclude.

Option 4. In the city of N, the population was 760 thousand people, of which: men – 340 thousand, women – 420 thousand. During the year, 9 thousand people died. Distribution of deaths by causes of death: circulatory system diseases – 4150; malignant neoplasms – 1750; accidents, poisoning and injuries – 3100.

Determine the structure of the population by gender.

Calculate the structure of causes of death.

Calculate the mortality rate for reasons.

To conclude.

PRACTICAL SKILL № 15

CALCULATION, ANALYSIS AND ASSESSMENT OF INDICATORS CHARACTERIZING THE ACTIVITIES OF PHYSICIANS AND HEALTH CARE ORGANIZATIONS (CITY POLICLINIC FOR ADULTS, HOSPITAL HOSPITALS, WOMEN'S CONSULTATIONS, CITY CHILDREN'S POLYCLINICS) ACCORDING TO THE ANNUAL REPORT AND ON THE BASIS OF PERFORMANCE INDICATORS AND INDICATORS OF DEFECTS IN MODELS OF FINAL RESULTS (MFR)

Evaluation of medical institutions, individual departments, individual health administrative area in General is one of the major problems of the Department of health.

Model outcomes for the medical institutions is a special technique that allows you to objectively assess the work of the institution and to conduct a comparative analysis of the activities of the various medical institutions.

The performance of health facilities is assessed according to three main groups of indicators:

1. Health indicator:

- total mortality rate;
- standardized (by age) total mortality rate (this indicator is taken into account for the year preceding the reporting year);
- infant mortality rate;
- perinatal mortality rate;
- indicators of morbidity: with TD, with TD health workers, the incidence of acute gastrointestinal diseases, active tuberculosis of the respiratory system;
- primary access to disability at working age;
- primary access to disability before the age of 18;
- fitness for military service.

2. Performance indicator:

- return to work of persons who have suffered myocardial infarction at working age;
- coverage of professional examinations of women (with cytological examination);
- prevalence of abortion (vacuum regulation);
- identification of patients with chronic alcoholism and alcoholic psychosis;
- indicators of detection of patients with syphilis and gonorrhea with a diagnosis for the first time in life;

- morphological confirmation of malignant neoplasm;
- periodic inspections of persons entered in the state register;
- indicators of completeness of periodic inspections Teens;
- completeness of coverage of professional examinations of disabled persons and participants of war;
- full and partial rehabilitation of disabled persons;
– indicator of the state of immunization of children;
- examination for tuberculosis (X-ray fluorography);
- proportion of day-care beds in hospitals;
- the share of outpatient clinics with day hospitals;
- pathological autopsies;
- 24-hour mortality of children under 1 year in hospitals;
- bed occupancy;
- average duration of treatment in bed;
- frequency of occupational injuries of health workers;
- activities of physiotherapy services;
- advanced training by doctors;
- professional development of health workers with secondary education;
- share of doctors with qualification category;
- share of the average medical workers having qualification category.

3. Defect rates:
- identification of patients in advanced stages of cancer;
- indicator of detection of patients in advanced stages of tuberculosis;
- late diagnosis of breast cancer;
- maternal mortality from all causes;
- postoperative mortality in acute diseases of the abdominal cavity;
- hospital mortality from acute myocardial infarction;
- mortality from acute pneumonia (adults and adolescents);
- the incidence of diphtheria;
- the proportion of mismatches of pathoanatomical and clinical diagnoses;
- fatal accidents of health workers due to violation of safety requirements;
- reasonable complaints.

Indicators of health, activity and defects in the development of MD are selected taking into account the specifics of institutions:

A) *for the city polyclinic*: access to disability of persons of working age, rehabilitation of disabled persons, the percentage of exacerbation of diseases in dispensary patients, identification of patients in the advanced stage of tuberculosis, cancer, etc.

B) *for the pediatric clinic*: the incidence of measles among children, coverage of children with vaccinations, the incidence of polio, the children, etc.

C) *for dental clinic*: the proportion of sanitized from the number of primary patients, the ratio of uncomplicated and complicated caries, alteration of dentures, etc.

In order to carry out the MFR analysis, the health authorities approve the Control values of the above listed health indicators and performance indicators. The value of these indicators is established taking into account their dynamics on this institution for several years, the Republican indicators, the expected change of this indicator as a result of implementation of the planned organizational actions. The value of the benchmark should be such that its achievement requires efforts from medical institutions to mobilize resources, intensify the work of workers, improve work. It is desirable that the control value exceeds the previous level by at least 5%. In the future, when this result is achieved, the indicator should be revised in the direction of increasing its value. Due to the fact that there should be no defects in the activity, control values for them are not established.

When analyzing the activities of medical institutions, a numerical assessment of indicators is carried out, for which each indicator is approved by an Evaluation scale (from 1 to 10 points). The scale determines the relative importance of this indicator among other performance indicators (*example*: infant mortality rate – 2 points, and military fitness – 0.5 points, which emphasizes the importance of the first indicator).

The deviation of the value of the actual indicator from the reference value can be both in the direction of excess and decrease, therefore, for each indicator, a deviation Sign "+" or "- "is determined. The "-" sign shows that when the actual value of the indicator increases relative to the control value, its evaluation will be reduced. The " + " sign means that an increase in the value of the indicator compared to the control increases its assessment (*example*: the actual total mortality rate of 13.2, the control value of 12.9; in the evaluation scale for the indicator of total mortality, the sign " - " is defined, which means that the excess of the actual indicator compared to the control means that the score should be reduced).

When approving the control indicators, the assessment (in points) of the deviation per unit of measurement is also approved.

The ultimate goal of the MFR – a total assessment of performance, which is expressed by the coefficient of achievement of the result (CAR) – determines the ratio of the actual amount of points achieved (minus the amount of points on the indicators of defects) to the sum of control points.

Example. Some performance indicators that reflect the health of the population and defects indicators that characterize the activities of doctors and health care organizations (city polyclinic for adults, city hospital, women's clinic, city children's polyclinic) according to the annual report and on the basis

of performance indicators and indicators of defects in models of final results (MFR).

After calculation of each performance indicator and defects indicator it is necessary to draw the following conclusions:

• To place the signs "↑" or "↓" next to each result of the indicators, depending on the values you calculated - this will mean that you compared the result of the base year (last year) with the current year (this year);

• put "+" or "–" signs next to each obtained result of indicators, depending on whether you consider an increase or decrease in the indicator as a positive or negative phenomenon.

For example: Indicator "% of hospitalization" "↑" compared with the base year data from 94.5% to 96.6%:

• This can be explained as "+", i.e. more sick people receive qualified medical care in the hospital, and their illness will go away without complications, they will be under medical supervision around the clock.

• This can be explained as "–", i.e. ambulance workers do not have enough funds to provide home care or each hospitalization is an economically costly phenomenon for health care, or the patient does not pay attention to their own health and does not follow the advice of a doctor at home.

Hint for defect indicators: if you write "↑" next to the indicator, it is always "–"; if you write "↓" next to the indicator, it is always "+".

Name indicators'	***Method of calculation of indicators***	***Calculation of levels current year indicators***	***Levels base year indicators***
Performance indicators			
Total mortality	$\frac{\text{Number of deaths per year}}{\text{Average number of people served}} \times 1000$		14,2
Morbidity (primary)	$\frac{\text{Number of primary diseases, registered for the year}}{\text{Average number of persons served}} \times 100\,000$		71,100
Primary access to disability of children under 18 years	$\frac{\text{Number of cases of disability of children up to 18 years}}{\text{Average number of population under 18 years}} \times 10\,000$		16,9
Immunization coverage of the adult population	$\frac{\text{Number of immunized per year}}{\text{Number of immunized}} \times 100$		95,8
Prevalence of hypertension	$\frac{\text{Number of patients with hypertension, registered for the year}}{\text{Average number of served population}} \times 100\,000$		4.400
The coverage of women's preventive inspections	$\frac{\text{Number of women actually examined}}{\text{Number of women to be examined under the plan}} \times 100$		95,45
Percentage proportion of women fertile age's	$\frac{\text{Number of women of childbearing age}}{\text{Average number female population}} \times 100$		47,55
Average number of visits by pregnant women and maternity clinics	$\frac{\text{Number of visits by pregnant women who gave birth in the reporting year}}{\text{Number of women who gave birth in the reporting year}}$		17

Systematic observation of children by a doctor	$\frac{\text{Number of children under 1 year (2 years)of life under medical supervision without long breaks}}{\text{Number of children who have reached 1 year (2 years) in the reporting year}} \times 100$		
Defect indicators			
Identification of patients in advanced stages of cancer	$\frac{\text{Number of patients identified in advanced stages of the disease}}{\text{Number of newly diagnosed patients with the disease}} \times 100$		10
Reasonable complaints of the population for the year	$\frac{\text{Number of justified complaints per year}}{\text{Average population}} \times 10\,000$		0,39
The proportion of community-acquired (criminal) abortions'	$\frac{\text{Number of non} - \text{hospital (criminal) abortions per year}}{\text{Number of abortions per reporting year}} \times 100$		2,25
Under-5 mortality rate	$\frac{\text{Number of children under} - 5 \text{ who died in a year}}{\text{Number of children born alive in a year}} \times 1000$		915,15

TASKS FOR SELF-ACCESS WORK

Option 1

Name indicators'	***Method of calculation of indicators***	***Calculation of levels current year indicators***	***Levels base year indicators***
Performance indicators			
Total mortality	$\frac{149{,}720}{9{,}920{,}000} \times 1000$		14.3
Morbidity (primary)	$\frac{7{,}162{,}500}{9{,}920{,}000} \times 100\,000$		71,500
Primary access to disability of children under 18 years	$\frac{3{,}600}{2{,}245{,}000} \times 10\,000$		16,8
Immunization coverage of the adult population	$\frac{8{,}620{,}500}{8{,}950{,}000} \times 100$		97,2
Prevalence of hypertension	$\frac{441{,}500}{9{,}920{,}000} \times 100\,000$		4,150.5
The coverage of women's preventive inspections	$\frac{2{,}120{,}000}{2{,}500{,}000} \times 100$		96.5
Percentage proportion of women fertile age's	$\frac{1{,}180{,}000}{2{,}500{,}000} \times 100$		48.4
Average number of visits by pregnant women and maternity clinics	$\frac{3{,}100{,}000}{300{,}000}$		10

Systematic observation of children by a doctor	$\frac{13,620}{13,910} \times 100$		98.9
Defect indicators			
Identification of patients in advanced stages of cancer	$\frac{4,210}{34,520} \times 100$		11.1
Reasonable complaints of the population for the year	$\frac{362}{9,920,000} \times 10\,000$		0,4
The proportion of community-acquired (criminal) abortions'	$\frac{2}{82} \times 100$		2.1
Under-5 mortality rate	$\frac{10}{420} \times 1000$		910.5

Option 2

Name indicators'	*Method of calculation of indicators*	*Calculation of levels current year indicators*	*Levels base year indicators*
	Performance indicators		
Total mortality	$\frac{152,600}{9,850,000} \times 1000$		13.9
Morbidity (primary)	$\frac{7,120,500}{9,850,000} \times 100\ 000$		70,900
Primary access to disability of children under 18 years	$\frac{3,490}{2,190,000} \times 10\ 000$		16,1
Immunization coverage of the adult population	$\frac{8,580,000}{8,900,000} \times 100$		96,9
Prevalence of hypertension	$\frac{438,800}{9,850,000} \times 100\ 000$		4,210.5
The coverage of women's preventive inspections	$\frac{1,910,000}{2,000,500} \times 100$		97.1
Percentage proportion of women fertile age's	$\frac{952,300}{2,000,500} \times 100$		46.9
Average number of visits by pregnant women and maternity clinics	$\frac{2,720,000}{248,000}$		10

Systematic observation of children by a doctor	$\frac{14,690}{15,210} \times 100$		99.1
Defect indicators			
Identification of patients in advanced stages of cancer	$\frac{5,410}{38,940} \times 100$		11.1
Reasonable complaints of the population for the year	$\frac{563}{9,850,000} \times 10\,000$		0,27
The proportion of community-acquired (criminal) abortions'	$\frac{3}{94} \times 100$		2.8
Under-5 mortality rate	$\frac{8}{520} \times 1000$		900.4

Option 3

Name indicators'	*Method of calculation of indicators*	*Calculation of levels current year indicators*	*Levels base year indicators*
	Performance indicators		
Total mortality	$\frac{163,120}{9,050,000} \times 1000$		14.3
Morbidity (primary)	$\frac{7,180,000}{9,050,000} \times 100\ 000$		68,500
Primary access to disability of children under 18 years	$\frac{3,150}{2,150,000} \times 10\ 000$		15,5
Immunization coverage of the adult population	$\frac{8,300,000}{8,900,000} \times 100$		95,3 %
Prevalence of hypertension	$\frac{620,100}{9,050,000} \times 100\ 000$		5,050.2
The coverage of women's preventive inspections	$\frac{2,970,000}{3,731,000} \times 100$		98.4 %
Percentage proportion of women fertile age's	$\frac{1,250,000}{3,010,500} \times 100$		47.9 %
Average number of visits by pregnant women and maternity clinics	$\frac{6,420,000}{520,000}$		10

Systematic observation of children by a doctor	$\frac{17,420}{17,990} \times 100$		99.1 %
Defect indicators			
Identification of patients in advanced stages of cancer	$\frac{7,320}{38,300} \times 100$		12.4 %
Reasonable complaints of the population for the year	$\frac{422}{9,050,000} \times 10\,000$		0,48
The proportion of community-acquired (criminal) abortions'	$\frac{2}{75} \times 100$		1.9 %
Under-5 mortality rate	$\frac{11}{720} \times 1000$		927.3 $^{o}/_{oo}$

Option 4

Name indicators'	*Method of calculation of indicators*	*Calculation of levels current year indicators*	*Levels base year indicators*
	Performance indicators		
Total mortality	$\frac{95,800}{7,500,000} \times 1000$		12.9
Morbidity (primary)	$\frac{5,200,500}{7,500,000} \times 100\,000$		69,800
Primary access to disability of children under 18 years	$\frac{1,980}{1,945,000} \times 10\,000$		15,1
Immunization coverage of the adult population	$\frac{6,610,500}{7,055,000} \times 100$		93,5
Prevalence of hypertension	$\frac{331,500}{7,500,000} \times 100\,000$		3,900.5
The coverage of women's preventive inspections	$\frac{1,670,000}{1,900,000} \times 100$		95.6
Percentage proportion of women fertile age's	$\frac{954,000}{1,900,000} \times 100$		47.1
Average number of visits by pregnant women and maternity clinics	$\frac{2,458,000}{195,000}$		10

Systematic observation of children by a doctor	$\frac{9{,}000}{9{,}910} \times 100$		95.4
Defect indicators			
Identification of patients in advanced stages of cancer	$\frac{3{,}930}{27{,}230} \times 100$		11.1
Reasonable complaints of the population for the year	$\frac{202}{7{,}500{,}000} \times 10\,000$		0.31
The proportion of community-acquired (criminal) abortions'	$\frac{1}{53} \times 100$		1.4
Under-5 mortality rate	$\frac{19}{625} \times 1000$		820.5

PRACTICAL SKILL № 16

CALCULATE THE COEFFICIENT ACHIEVEMENT OF THE RESULT (CAR) A SPECIFIC HEALTH CARE ORGANIZATIONS, PERFORMANCE INDICATORS AND DEFECT INDICATORS (MUNICIPAL TERRITORIAL POLYCLINICS AND CITY HOSPITAL) ON THE BASIS OF MODELS OF FINAL RESULTS (MFR)

As mentioned above, the ultimate goal of the MFR – the total assessment of performance, which is expressed by the coefficient of achievement of the result (CAR) – determines the ratio of the actual amount of points achieved (minus the amount of points on the indicators of defects) to the total score of benchmarks. The value of the CAR shows how the results achieved differ from the control values approved by the health authorities.

Evaluation of the medical organization by the size of the CAR allows you to compare the results of the various medical institutions (administrative territories), to carry out operational control and develop a management decision. If the CAR has a negative value, financial incentives (bonuses) to employees of the medical organization is not paid.

The methodology for calculating the coefficient of achievement of the result (CAR):

1st stage – calculation of the EFFECTIVE INDICATORS.

The indicators of numerical assessment of health and activities based on MFR are based on a comparison of the actual achieved EI with the projected level, the difference is multiplied by the deviation estimate for this indicator (multiplier). The resulting score is added (subtracted) depending on the sign with an estimate of the standard of this indicator, thus, the evaluation of the performance of a particular PI is calculated.

The sum of these estimates is the final evaluation of the implementation of the EI.

BALL = Level forecast ± (Actual value – Projected level) × Per unit.

2nd stage – calculation of the DEFECTS INDICATORS.

If during the reporting period there were defects in the activities considered in the MFR, then the corresponding figures are multiplied by a factor, the results of all the defects are summed up, and a final defect estimate for the settlement period is obtained.

BALL = Actual value × Per unit.

3rd stage –calculation of the EFFECTIVE BALL SCORE – this is the sum of the scores of each indicator of health assessment and activity.

EBS = EI 1 + EI 2, etc.

4th stage – calculation of the BALL MARK NORMATIVE, which represents the sum of the level forecast estimates.

BMN = Level forecast 1+ Level forecast 2, etc.

5th stage –calculation of the DEFECTIVE BALL SCORE, which represents the sum of the points of each DI.

DBS = DI 1 + DI 2, etc.

6th stage – calculation of the COEFFICIENT ACHIEVEMENT OF THE RESULT (CAR).

$$CAR = \frac{EBS - DBS}{BMN}$$

The resulting number is usually a decimal fraction, since according to a correctly formed model its predicted values should be difficult to achieve; this is called the coefficient of achievement of the result, which shows how the activity of the evaluated team meets the requirements for it.

In this system, a concrete numerical assessment of the degree of implementation of plans based on the analysis of the final results of activities is carried out, differentiated by the types of health authorities, medical organizations, their units, reflecting the achievement of goals and performance of functions, that is realizing the requirements of the system approach in practice.

The system of the degree of achievement of goals and performance of functions, expressed by the CAR, is used in determining the size of material incentives.

In the event that the sum of the assessment of the PD exceeds the amount of the valuation of the PR and their ratio acquires a negative value, no material incentive is paid.

Gradation of the CAR:

1. Low level of CAR – from 0 to 0,19 inclusive.
2. Below average – from 0,20 to 0,39 inclusive.
3. Average level of CAR – from 0,40 to 0,59 inclusive.
4. Above the average – from 0,60 to 0,79 inclusive.
5. High level of CAR – from 0,80 and higher.

Example. Model of the final results of the health organization in the country for a certain year:

Name of indicators	***Unit***	***Projected level***	***Actual value***	***Level forecast***	***Sign***	***Per unit***	***Result in points***
1	2	3	4	5	6	7	8
Performance indicators							
Total mortality for the year	Cases per 1,000 population	13,5	12,4	2	-	0,05	
Temporary disability	Working days per 100 employees	635,0	710,2	3	-	0,01	
Detection of patients with alcoholism	Cases diagnosed per 100,000 population	264,0	255,0	2	+	0,02	
Activities of emergency medical care	Number of crew visits per 1,000 population	275,0	285,3	4	-	0,01	
Level of hospitalization	% to population	21,0	25,2	4	-	0,1	
Autopsies at the hospital	% to deaths	65,0	85,5	3	+	0,02	
Defect indicators							
The identification of patients in advanced stages of cancer (stage 3-4)	% to the total number of detected patients	0	14,6	0	-	0,06	
Maternal mortality	Cases	0	3	0	-	1,5	
Postoperative mortality from pathology	Cases per 100 operated	0	2,0	0	-	2,0	
Reasonable complaints	Cases per 10,000 population	0	0,03	0	-	5,0	

TASKS FOR SELF-ACCESS WORK

Option 1. Calculate the coefficient achievement of the result (CAR) on the basis of data from the model of final results (MFR). Analyze the result and make a conclusion.

Name of indicators	***Unit***	***Projected level***	***Actual value***	***Level forecast***	***Sign***	***Per unit***	***Result in points***
1	2	3	4	5	6	7	8
Performance indicators							
Total mortality for the year	Cases per 1,000 population	12,8	12,0	2	-	0,05	
Temporary disability	Working days per 100 employees	630,0	705,5	2	-	0,01	
Detection of patients with alcoholism	Cases diagnosed per 100,000 population	259,0	245,0	2	+	0,02	
Activities of emergency medical care	Number of crew visits per 1,000 population	270,0	282,2	3	-	0,01	
Level of hospitalization	% to population	21,5	23,9	3	-	0,1	
Autopsies at the hospital	% to deaths	61,0	84,5	2	+	0,02	
Defect indicators							
The identification of patients in advanced stages of cancer (stage 3-4)	% to the total number of detected patients	0	11,6	0	-	0,05	
Maternal mortality	Cases	0	2	0	-	1,1	
Postoperative mortality from pathology	Cases per 100 operated	0	2,1	0	-	2,2	
Reasonable complaints	Cases per 10,000 population	0	0,02	0	-	5,0	

Option 2. Calculate the coefficient achievement of the result (CAR) on the basis of data from the model of final results (MFR). Analyze the result and make a conclusion.

Name of indicators	***Unit***	***Projected level***	***Actual value***	***Level forecast***	***Sign***	***Per unit***	***Result in points***
1	2	3	4	5	6	7	8
Performance indicators							
Total mortality for the year	Cases per 1,000 population	12,5	11,4	1	-	0,05	
Temporary disability	Working days per 100 employees	625,0	700,5	2	-	0,01	
Detection of patients with alcoholism	Cases diagnosed per 100,000 population	242,0	225,0	1	+	0,02	
Activities of emergency medical care	Number of crew visits per 1,000 population	265,0	275,5	3	-	0,01	
Level of hospitalization	% to population	22,0	24,5	4	-	0,1	
Autopsies at the hospital	% to deaths	62,0	82,5	2	+	0,02	
Defect indicators							
The identification of patients in advanced stages of cancer (stage 3-4)	% to the total number of detected patients	0	13,5	0	-	0,05	
Maternal mortality	Cases	0	2	0	-	1,0	
Postoperative mortality from pathology	Cases per 100 operated	0	1,5	0	-	2,0	
Reasonable complaints	Cases per 10,000 population	0	0,02	0	-	4,0	

Option 3. Calculate the coefficient achievement of the result (CAR) on the basis of data from the model of final results (MFR). Analyze the result and make a conclusion.

Name of indicators	***Unit***	***Projected level***	***Actual value***	***Level forecast***	***Sign***	***Per unit***	***Result in points***
1	2	3	4	5	6	7	8
Performance indicators							
Total mortality for the year	Cases per 1,000 population	12,5	12,1	2	-	0,05	
Temporary disability	Working days per 100 employees	629,0	699,0	3	-	0,01	
Detection of patients with alcoholism	Cases diagnosed per 100,000 population	259,0	252,0	2	+	0,02	
Activities of emergency medical care	Number of crew visits per 1,000 population	268,0	278,0	4	-	0,01	
Level of hospitalization	% to population	22,0	22,2	4	-	0,1	
Autopsies at the hospital	% to deaths	68,0	80,5	3	+	0,02	
Defect indicators							
The identification of patients in advanced stages of cancer (stage 3-4)	% to the total number of detected patients	0	13,5	0	-	0,05	
Maternal mortality	Cases	0	2	0	-	1,5	
Postoperative mortality from pathology	Cases per 100 operated	0	2,0	0	-	2,0	
Reasonable complaints	Cases per 10,000 population	0	0,02	0	-	5,0	

Option 4. Calculate the coefficient achievement of the result (CAR) on the basis of data from the model of final results (MFR). Analyze the result and make a conclusion.

Name of indicators	***Unit***	***Projected level***	***Actual value***	***Level forecast***	***Sign***	***Per unit***	***Result in points***
1	2	3	4	5	6	7	8
Performance indicators							
Total mortality for the year	Cases per 1,000 population	12,8	12,5	2	-	0,05	
Temporary disability	Working days per 100 employees	625,5	700,4	3	-	0,01	
Detection of patients with alcoholism	Cases diagnosed per 100,000 population	265,5	253,5	2	+	0,02	
Activities of emergency medical care	Number of crew visits per 1,000 population	275,5	2283,6	4	-	0,01	
Level of hospitalization	% to population	22,5	24,4	4	-	0,1	
Autopsies at the hospital	% to deaths	63,5	82,2	3	+	0,02	
Defect indicators							
The identification of patients in advanced stages of cancer (stage 3-4)	% to the total number of detected patients	0	12,8	0	-	0,04	
Maternal mortality	Cases	0	3	0	-	1,5	
Postoperative mortality from pathology	Cases per 100 operated	0	2,0	0	-	2,0	
Reasonable complaints	Cases per 10,000 population	0	0,02	0	-	4,0	

PRACTICAL SKILL № 17

THE CALCULATION OF THE CASH EXPENDITURES ON FOOD, MEDICINE AND BANDAGES ON THE COST ESTIMATES

Calculation of the need for hospitalization. The calculation of the need for hospitalization is made for each structural unit as follows:

$$\boldsymbol{Y = \frac{(y_1 + y_2) \times 1000}{H}}$$

where:

Y – number of treated patients (hospitalization rate) per 1000 inhabitants;

$\boldsymbol{y_1}$ – the number of patients actually treated during the reporting (analyzed) period;

$\boldsymbol{y_2}$ – the number of patients who needed hospitalization, but were not hospitalized for various reasons;

H – the number of the population attached to service by the hospital organization for which the need is defined.

Calculation of the need for the number of beds. The need for the number of beds is calculated for each structural unit according to the following formula:

$$\boldsymbol{K = \frac{H \times Y \times P}{E \times 1000}}$$

where:

K – need for number of beds;

H – the number of the population attached to service by the hospital organization;

Y – number of treated patients (hospitalization rate) per 1000 inhabitants;

P – the average duration (number of days) of the patient's treatment;

E – the planned number of days of employment of the bed in a year.

Calculation of the number of bed-days. The number of bed-days for each structural unit for the planned year is determined based on the planned number of:

$$\boldsymbol{K = \frac{Y \times H \times P}{1000}}$$

K – number of bed-days;

Y – number of treated patients (hospitalization rate) per 1000 inhabitants;

H – the number of the population assigned to service of the hospital organization;

P – the average duration (number of days) of the patient's treatment.

Example 1. Calculate the need for hospitalization, if: the number of actually treated patients (Y_1) was 29,700 people in need of hospitalization, but not hospitalized (Y_2) – 1 812 people, the population (N) – 100,000 people.

$$\boldsymbol{Y = \frac{(Y_1 + Y_2) \times 1000}{H} = \frac{(29700 + 1812) \times 1000}{100000} = 315}$$

Example 2. Calculate the need for the number of beds (K), if the population (H) 100,000 people, the level of hospitalization (Y) – people., the average duration of treatment of the patient (number of days) (P) – 12, the planned number of employment beds in the year (D) – 340 days.

$$\boldsymbol{K = \frac{H \times Y \times P}{D \times 1000} = \frac{100000 \times 315 \times 12}{340 \times 1000} = 1112\ (beds)}$$

Example 3. Calculate the number of bed-days (K) for the planned year, if the number of treated patients (hospitalization level) (Y) was 29,700 people, the population (H) – 100,000 people, the average duration of days of treatment (P) – 12 days.

$$\boldsymbol{K = \frac{H \times Y \times P}{1000} = \frac{12 \times 27900 \times 100000}{1000} = 33480000\ (bed - days)}$$

Example 4. On the basis of the following basic data of the model task, calculate the cost of food (cost element 1100304) in the hospital, if:
Bedspace – 485 beds for profiles:

- Therapeutic Department – 75 beds;
- Surgery Department №1 – 75 beds;
- Surgery Department №2 – 75 beds;
- Proctology Department – 60 beds;
- Gynecology Department – 50 beds;
- Cardiology Department – 50 beds;
- Gastroenterology Department – 50 beds;
- Pulmonology Department – 50 beds.

Expenses (costs) for the nutrition of patients is calculated based on the number of bed-days for each structural unit and monetary standards of expenditure on food per patient per day, calculated according to the prices valid in the region where is located the hospital organization, and are involved in regulatory, planning and the cost of medical care.
Estimated cash flow rates per patient per day:

- Surgery Department, Proctology Department – 4,019 rubles;

– Therapeutic Department, Gastroenterology Department – 3,955 rubles;
– Gynecology Department – 4,000 rubles;
– Cardiology Department – 4,005 rubles;
– Pulmonology Department – 4,055 rubles.

The method of calculating the cost of patient nutrition. We count the number of bed-days in the departments and in the hospital:

– Therapeutic Department – 75 beds × 340 days = 25,500 bed days;
– Surgery Department №1 – 75 beds × 340 days =25,500 bed-days;
– Surgery Department №2 – 75 beds × 340 days =25,500 bed-days;
– Proctology Department – 60 beds × 340 days = 20,400 bed-days;
– Gynecology Department – 50 beds × 340 days = 17,000 bed-days;
– Cardiology Department – 50 beds × 340 days = 17,000 bed-days;
– Gastroenterology Department – 50 beds × 340 days = 17,000 bed-days;
– Pulmonology Department – 50 beds × 340 days = 17,000 bed-days.

Total hospital – 164,900 bed-days.

We calculate the cost of patient nutrition:

– Therapeutic Department – 25,500 bed-days ×3,955 rubles = 100,852,500 rubles;
– Surgery Department №1 – 25,500 bed-days × 4,019 rubles = 102,484,500 rubles;
– Surgery Department №2 – 25,500 bed-days × 4,019 rubles = 102,484,500 rubles;
– Proctology Department – 20,400 bed-days × 4,019 rubles = 102,484,500 rubles;
– Gynecology Department – 17,000 bed-days × 4,000 rubles = 68,000,000 rubles;
– Cardiology Department – 17,000 bed-days × 4,005 rubles = 68,085,000 rubles;
– Gastroenterology Department – 17,000 bed-days × 3,955 rubles = 67,235,000 rubles;
– Pulmonology Department – 17,000 bed-days × 4,055 rubles = 68,935,000 rubles.

Total hospital – 680 561 000 rubles.

On the basis of initial data given below, calculate the cost of medicines and dressing (expense item 1100302) in hospitals, if:
Bedspace 485 beds for profiles:

– Therapeutic Department – 75 beds;

– Surgery Department №1 – 75 beds;
– Surgery Department №2 – 75 beds;
– Proctology Department – 60 beds;
– Gynecology Department – 50 beds;
– Cardiology Department – 50 beds;
– Gastroenterology Department – 50 beds;
– Pulmonology Department – 50 beds.

The costs of medicines and dressings included in the standard and planned cost of medical care are calculated on the basis of the average expense for one bed-day which actually developed for last years in quantitative expression, and the number of beds-days provided for the planned year on each structural division.

Estimated cash flow rates for medicines per patient per day:

– Surgery Department, Proctology Department – 8,685 rubles;
– Therapeutic Department, Gastroenterology Department – 3,102 rubles;
– Gynecology Department – 7,480 rudders;
– Cardiology Department – 4,005 rubles;
– Pulmonology Department – 9,461 rubles.

Methods of calculation of indicators. ***We count the number of bed-days in the departments and in the hospital:***

– Therapeutic Department – 75 beds × 340 days = 25,500 bed-days;
– Surgery Department №1 – 75 beds × 340 days =25,500 bed-days;
– Surgery Department №2 – 75 beds × 340 days =25,500 bed-days;
– Proctology Department – 60 beds × 340 days = 20,400 bed-days;
– Gynecology Department – 50 beds × 340 days = 17,000 bed-days;
– Cardiology Department – 50 beds × 340 days = 17,000 bed-days;
– Gastroenterology Department – 50 beds × 340 days =17,000 bed-days;
– Pulmonology Department – 50 beds × 340 days = 17,000 bed-days.

Total hospital – 164,900 bed-days.

We expect the cost of medicines and dressings:

– Therapeutic Department – 25,500 bed-days × 3,102 rubles = 79,101,000 rubles;
– Surgery Department №1 – 25,500 bed-days × 8,685 rubles = 221,467,500 rubles;
– Surgery Department №2 – 25,500 bed-days × 8,685 rubles = 221,467,500 rubles;

- Proctology Department – 20,400 bed-days × 8,685 rubles = 221,467,500 rubles;
- Gynecology Department – 17,000 bed-days × 7,480 rubles = 127,160,000 rubles;
- Cardiology Department – 17,000 bed-days × 4,005 rubles = 68,085,000 rubles;
- Gastroenterology Department – 17,000 bed-days × 3,102 rubles = 52,734,000 rubles;
- Pulmonology Department – 17,000 bed-days × 9,461 rubles = 160,837,000 rubles.

Total hospital – 1,108,026,000 rubles.

TASKS FOR SELF-ACCESS WORK

Option 1.

1. Calculate the need for hospitalization if: the number of actually treated patients was 3000 people who needed hospitalization but were not hospitalized - 61 people, the population – 10,000 people.

2. Calculate the number of bed-days for the planned year, if the number of treated patients was 315,400 people, the population is 15,000 people, the average duration of treatment is 11.3 days.

3. To calculate the cost of food, drugs and dressing facilities in the hospital departments, if the bed capacity is 250 beds, of which: Therapeutic Department unit is 70 beds, Surgery Department unit is 70 beds, Gynecology Department unit is 30 beds, Cardiology Department unit is 40 beds, Pulmonology Department – 40 beds.

4. Estimated monetary norms of food consumption per day: Therapeutic Department – 3955 rubles, Surgery Department – 4019 rubles, Gynecology Department – 4000 rubles, Cardiology Department – 4005 rubles, Pulmonology Department – 4055 rubles.

5. Estimated monetary standards for the consumption of medicines per patient per day Therapeutic Department – 3102 rubles, Surgery Department – 8685 rubles, Gynecology Department – 7480 rubles, Cardiology Department – 4005 rubles, Pulmonology Department – 9460 rubles.

Option 2.

1. Calculate the need for hospitalization if: the number of actually treated patients was 1950 people who needed hospitalization but were not hospitalized – 199 people, the population – 33,000 people.

2. Calculate the number of bed-days for the planned year, if the number of treated patients was 3,705 people, the population is 17,650 people, the average duration of treatment is 11.4 days.

3. To calculate the cost of food, medicine and dressing facilities in the hospital departments, if the bed capacity is 300 beds, of which: Therapeutic Department unit is 80 beds, Surgery Department unit is 70 beds, Gynecology Department unit is 50 beds, Cardiology Department unit is 50 beds, Pulmonology Department – 50 beds.

4. Estimated monetary norms of food consumption per day: Therapeutic Department – 3955 rubles, Surgery Department – 4019 rubles, Gynecology Department – 4000 rubles, Cardiology Department – 4005 rubles, Pulmonology Department – 4055 rubles.

5. Estimated monetary standards for the consumption of medicines per patient per day Therapeutic Department – 3102 rubles, Surgery Department – 8685 rubles, Gynecology Department – 7480 rubles, Cardiology Department – 4005 rubles, Pulmonology Department – 9460 rubles.

Option 3.

1. Calculate the need for hospitalization if: the number of actually treated patients was 6,700 people who needed hospitalization but were not hospitalized – 149 people, the population – 15,000 people.

2. Calculate the number of bed-days for the planned year, if the number of treated patients was 35,700 people, the population is 170,000 people, the average duration of treatment is 12.2 days.

3. To calculate the cost of food, medicine and dressing facilities in the hospital departments, if the bed capacity is 350 beds, of which: Therapeutic Department unit is 75 beds, Surgery Department unit is 75 beds, Gynecology Department unit is 50 beds, Cardiology Department unit is 80 beds, Pulmonology Department – 70 beds.

4. Estimated monetary norms of food consumption per day: Therapeutic Department – 3955 rubles, Surgery Department – 4019 rubles, Gynecology Department – 4000 rubles, Cardiology Department – 4005 rubles, Pulmonology Department – 4055 rubles.

5. Estimated monetary standards for the consumption of medicines per patient per day Therapeutic Department – 3102 rubles, Surgery Department – 8685 rubles, Gynecology Department – 7480 rubles, Cardiology Department – 4005 rubles, Pulmonology Department – 9460 rubles.

Option 4.

1. Calculate the need for hospitalization if: the number of actually treated patients was 3,550 people who needed hospitalization but were not hospitalized - 79 people, the population - 13,000 people.

2. Calculate the number of bed-days for the planned year, if the number of treated patients was 31,200 people, the population is 147,600 people, the average duration of treatment is 12.5 days.

3. Calculate the cost of food, medicine and dressing facilities in the hospital departments, if the bed capacity is 360 beds, of which: Therapeutic Department unit is 85 beds, Surgery Department unit is 75 beds, Gynecology Department unit is 55 beds, Cardiology Department unit is 75 beds, Pulmonology Department – 70 beds.

4. Estimated monetary norms of food consumption per day: Therapeutic Department – 3955 rubles, Surgery Department – 4019 rubles, Gynecology Department – 4000 rubles, Cardiology Department – 4005 rubles, Pulmonology Department – 4055 rubles.

5. Estimated monetary standards for the consumption of medicines per patient per day Therapeutic Department – 3102 rubles, Surgery Department – 8685 rubles, Gynecology Department – 7480 rubles, Cardiology Department – 4005 rubles, Pulmonology Department – 9460 rubles.

PRACTICAL SKILL № 18

CALCULATION, ANALYSIS AND EVALUATION OF ECONOMIC EFFICIENCY FROM REDUCING THE GENERAL MORBIDITY

Efficiency – the degree of achievement of the planned effect.

Effect – a specific end result that characterizes social, medical and economic efficiency.

Social efficiency – the degree of achievement of the goals in the field of improving demographic indicators. The social effect of health can be measured by indicators such as average life expectancy, birth rate, death rate, natural population growth, etc. It depends on the changes of all socio-economic conditions in the state.

Medical efficiency – the degree of achievement of the tasks in the field of prevention, diagnosis, treatment and rehabilitation. The medical effect of health care can be expressed by various statistical indicators that determine the level of morbidity and its trends, the number of sick and healthy persons, indicators characterizing the quality of medical care, etc.

Economic efficiency – the degree of achievement of positive results as a result of improving the health of the population. The economic impact can be measured by the number of lives saved in working age; the level of disability and its dynamics; the production of surplus products as a result of health interventions; the cost of eliminating or reducing certain diseases; the timeliness of material use and results, etc.

Economic efficiency in the broad sense of the term means the best use of the material, labour and financial resources of society to accelerate the achievement of its objectives. Increase it aims to achieve the best results at the lowest cost.

Economic efficiency is a relative value – the ratio of the effect to the necessary costs. This approach provides for achieving the maximum effect at a given cost or a given effect at a minimum cost. These comparisons are common methods of quantifying the effectiveness of social production in any industry.

Method of calculating the economic efficiency (EE) of reducing the general morbidity

1. ***Calculation of the prevented number of cases of general morbidity:***

$$\text{А}_{\text{пр}} = \frac{\text{А}_{\text{б}} - \text{А}_{\text{р}}}{N_1} \times N$$

$A_{пр}$ – prevented number of cases of General morbidity;
$A_б$ – total number of cases in the base year;
$A_р$ – total number of cases in the accounting year;
N – number of population;
N_1 – the incidence of General morbidity (on 10,000 or 100,000).

2. ***Calculation of the cost of treatment of 1 patient for 1 day:***

$$Л = \frac{С_3 \times n}{100} + \frac{С_1 \times n_1}{100 \times n_2}$$

Л – cost of treatment of 1 patient for 1 day;
C_3 – cost of 1 bed-day in the hospital;
n – % hospitalizations;
C_1 – cost of 1 visit to the polyclinic
n_1 – % treated in the polyclinic;
n_2 – frequency of patient visits to the polyclinic.

3. ***Calculation of economic losses from 1 case of the disease:***

$$У_1 = \left[(Д_1 + Б_1) \times t_k \times 0{,}75 \times \frac{P}{N}\right] + Л \times t_k$$

$У_1$ – economic losses from 1 case of the disease;
$Д_1$ – gross domestic product per 1 working day;
$Б_1$ – the average daily amount of temporary disability benefit;
t_k – the average duration of 1 case in days;
0,75 – coefficient of transfer of calendar days to working days;
P – number of working population;
N – total population;
Л – cost of treatment of 1 patient for 1 day.

4. ***Calculating the economic effect of reducing the General morbidity:***

$$Э = А_{пр} \times У_1$$

Э – economic effect of reducing the General morbidity;
$A_{пр}$ – prevented number of cases of General morbidity;
$У_1$ – economic losses from 1 case of the disease.

5. ***Calculation of the cost of medical care in the base and accounting years:***

$$С = Л \times \frac{А_б + А_р}{N_1} \times N$$

C – cost of medical care in the base and accounting years;

$Л$ – cost of treatment of 1 patient for 1 day;

$A_б$ – total number of cases in the base year;

A_p – total number of cases in the accounting year;

N – number of population;

N_1 – the incidence of General morbidity (on 10,000 or 100,000).

6. ***Calculating the economic efficiency (EE) of reducing the general morbidity:***

$$ЕЕ = \frac{Э}{С}$$

EE – economic efficiency (EE) of reducing the general morbidity;

$Э$ – economic effect of reducing the general morbidity;

C – cost of medical care in the base and accounting years.

Considering the problems of economic efficiency of health care, it should be borne in mind that the economic benefit should not conflict with the medical and social feasibility, with the moral foundations of our society.

Example. In a region with a population of 1,460,000 (773,840 employees) in a year was 18,482 cases of diseases of all classes of diseases per 100,000 population, and in the base year – 20,117 cases per 100 000 population. The average duration of 1 case was 18 calendar days. The level of hospitalization was 26%, 74% of the population was treated in the clinic. Patients visited the polyclinic with a frequency of 1 every 3 days. The cost of 1 visit to the clinic is 2,740 rubles, the cost of 1 bed-day – 20,360 rubles. The average size of the gross domestic product per 1 worker per 1 working day is 15,130 rubles, the average daily size of the temporary disability benefit is 8,570 rubles. Calculate the economic efficiency of reducing the general morbidity in the study area.

Decision. Initially, it is necessary to determine what indicator means in this task:

$A_б$ – 20,117 cases;

A_p – 18,482 cases;

N – 1,460,000 population;

N_1 – 100,000 population;

C_3 – 20,360 rubles;
n – 26%;
C_1 – 2,740 rubles;
n_1 – 76% treated in the polyclinic;
n_2 – 3 frequency of patient visits to the polyclinic.
$Д_1$ – 15,130 rubles;
$Б_1$ – 8,570 rubles;
t_k – 18 calendar days;
0,75 – coefficient of transfer of calendar days to working days;
P – 773,840 employees.

After that, the task must be solved according to the above formulas, substituting them with the values of the indicators from the task condition.

Conclusion. The economic efficiency of reducing the level of general morbidity in the study area is (your calculated efficiency) (i.e. for every ruble invested in modern technology of medical care or health measures, the state receives (your calculated efficiency) rubles profit.)

TASKS FOR SELF-ACCESS WORK

Option 1. In the region with a population of 1,341,000 people (of which 657,100 are working) in the calculated year, 16,975 diseases were registered by all classes of diseases per 100,000 population, and in the base year 18,700 cases of diseases per 100,000 population. The average duration of 1 case was 22 calendar days. The hospitalization rate was 24%, 76% of the population was treated in the clinic. Patients visited the clinic with a frequency of 1 every 3 days. The cost of 1 visit to the clinic is 2,750 rubles, the cost of 1 bed-day in the hospital is 20,350 rubles. The average gross domestic product per worker for 1 working day is 15,130 rubles, the average daily amount for temporary disability is 8,750 rubles. Calculate the cost-effectiveness of reducing the overall incidence in the study area.

Option 2. In the region with a population of 1,522,000 people (of which 821,900 workers), in the calculated year 19,265 diseases were registered by all classes of diseases per 100,000 population, and in the base year - 20,940 cases of diseases per 100,000 population. The average duration of 1 case of the disease was 20 calendar days. The hospitalization rate was

22%, 78% of the population was treated in the clinic. Patients visited the clinic with a frequency of 1 every 3 days. The cost of 1 visit to the clinic is 2,740 rubles, the cost of 1 bed-day in the hospital is 20,360 rubles. The average gross domestic product per worker for 1 working day is 15,130 rubles, the average daily amount for temporary disability is 8,750 rubles. Calculate the cost-effectiveness of reducing the overall incidence in the study area.

Option 3. In the region with a population of 1,285,000 people (of which 655,300 are working) in the calculated year, 16,255 diseases were registered by all classes of diseases per 100,000 population, and in the base year - 17,930 cases of diseases per 100,000 population. The average duration of 1 case was 19 calendar days. The hospitalization rate was 25%, 75% of the population was treated in the clinic. Patients visited the clinic with a frequency of 1 every 3 days. The cost of 1 visit to the clinic is 2,720 rubles, the cost of 1 bed-day in the hospital is 20,380 rubles. The average gross domestic product per worker for 1 working day is 15,130 rubles, the average daily amount for temporary disability is 8,750 rubles. Calculate the cost-effectiveness of reducing the overall incidence in the study area.

Option 4. In the region with a population of 1,460,100 people (of which 755.00 are employed), in the estimated year 18,860 diseases were registered by all classes of diseases per 100,000 population, and in the base year 19,970 cases of diseases per 100,000 population. The average duration of 1 case was 21 calendar days. The hospitalization rate was 26%, 74% of the population was treated in the clinic. Patients visited the clinic with a frequency of 1 every 3 days. The cost of 1 visit to the clinic is 2,740 rubles, the cost of 1 bed-day in the hospital is 20,360 rubles. The average gross domestic product per worker for 1 working day is 15,130 rubles, the average daily amount for temporary disability is 8750 rubles. Calculate the cost-effectiveness of reducing the overall incidence in the study area.

PRACTICAL SKILL № 19

CALCULATION, ANALYSIS AND EVALUATION OF ECONOMIC EFFICIENCY FROM A DECREASE IN INFECTIOUS MORBIDITY

1. ***Calculation of the prevented number of cases of a separate nosological form:***

$$А_{пр} = А_{б} - А_{р}$$

$А_{пр}$ – prevented number of cases of a separate nosological form;

$А_{б}$ – total number of cases of a separate nosological form in the base year;

$А_{р}$ – total number of cases of a separate nosological form in the accounting year.

2. ***Calculation of the prevented economic damage in the accounting year in a separate nosological form:***

$$ПЭУ = ЭУ_{ст} \times А_{пр}$$

$ПЭУ$ – prevented economic damage in the accounting year in a separate nosological form;

$ЭУ_{ст}$ – standard value of economic damage caused by 1 case of infectious disease by a separate nosological form;

$А_{пр}$ – prevented number of cases of a separate nosological form;

3. ***Calculation of the cost of medical care for the base and settlement year for a separate nosological form:***

$$С = С_{б} \times А_{б} + С_{р} \times А_{р}$$

$С$ – cost of medical care for the base and settlement year for a separate nosological form;

$С_{б}$ – the cost of medical care in a separate nosological form in the base year;

$А_{б}$ – total number of cases of a separate nosological form in the base year;

$С_{р}$ – the cost of medical care in a separate nosological form in the accounting year;

$А_{р}$ – total number of cases of a separate nosological form in the accounting year.

4. ***Calculation of economic efficiency of reducing the level of infectious diseases of a particular nosological form:***

$$ЭЭ = \frac{ПЭУ}{С}$$

ЭЭ – economic efficiency of reducing the level of infectious diseases of a particular nosological form;

ПЭУ – prevented economic damage in the accounting year in a separate nosological form;

С – cost of medical care in the base and accounting years for a separate nosological form.

Example. In the region, 773 cases of rubella were registered in the calculation year and in the base year – 970 cases of rubella. The economic damage of 1 case of rubella is 528,720 rubles, the cost of health care in this nosological form in the base and current years – 244,320 rubles. Calculate the cost effectiveness of reducing (or increasing) the level of infectious disease is a separate nosological form in the study area.

Decision. Initially, it is necessary to determine what indicator means in this task:

$A_б$ – 970 cases of rubella;

$A_р$ – 773 cases of rubella;

$ЭУ_{ст}$ – 528,720 rubles;

$A_{пр}$ – prevented number of cases of a separate nosological form;

$С_б$ – 244,320 rubles;

$С_р$ – 244,320 rubles.

After that, the task must be solved according to the above formulas, substituting them with the values of the indicators from the task condition.

Conclusion. The economic efficiency of reducing the incidence of rubella in the study area is (your calculated efficiency) (that is, for every ruble invested in modern technologies of medical care or recreational activities, the state receives (your calculated efficiency) rubles of profit).

TASKS FOR SELF-ACCESS WORK

Option 1. In the current year 34 cases of meningococcal infection were registered in the region, and in the base year – 42 cases of

meningococcal infection. The economic damage caused by 1 case of meningococcal infection is 881,500 rubles, the cost of medical care in this nosological form in the base and estimated years is 407,500 rubles. Calculate the economic efficiency (or economic losses) from a decrease (or increase) in the level of infectious morbidity of this particular nosological form in the study area.

Option 2. In the region 2 cases of measles were registered in the calculated year, and in the base year – 6 cases of measles. The economic damage caused by 1 case of measles is 616,500 rubles, the cost of medical care for this nosological form in the base and estimated years is 277,550 rubles. Calculate the economic efficiency (or economic losses) from a decrease (or increase) in the level of infectious morbidity of this particular nosological form in the study area.

Option 3. In the region 3 cases of diphtheria were registered in the estimated year, and in the base year – 9 cases of diphtheria. The economic damage caused by 1 case of diphtheria is 773.605 rubles, the cost of medical care in this nosological form in the base and estimated years is 366,450 rubles. Calculate the economic efficiency (or economic losses) from a decrease (or increase) in the level of infectious morbidity of this particular nosological form in the study area.

Option 4. In the calculated year 755 cases of rubella were registered in the region, and in the base year – 970 cases of rubella were recorded. The economic damage caused by 1 case of rubella is 527,720 rubles, the cost of medical care in this nosological form in the base and estimated years is 244,350 rubles. Calculate the economic efficiency (or economic losses) from a decrease (or increase) in the level of infectious morbidity of this particular nosological form in the study area.

MEDICAL-HYGIENIC TRAINING AND EDUCATION OF THE POPULATION

Health promotion is a process that provides the population with the opportunity to monitor the state of their health and the factors affecting them. The health promotion strategy uses not only interdisciplinary, but also cross-sectoral approaches that integrate the individual and his environment into a single system, ensuring the synthesis of personal choice and social responsibility in achieving a healthier future. The core and basis of the health promotion strategy is health education and training of the population.

Health education-part of the public health system, including the dissemination of medical and hygienic knowledge, the formation of a healthy lifestyle (HLS) and instilling hygienic skills in the population in order to maintain and strengthen health, improve efficiency and active longevity.

The main purpose of medical and hygienic education of the population is the formation of knowledge and skills to make decisions on the preservation and promotion of health.

There is now a gap between hygienic knowledge and human behavior. Therefore, there is a need to turn knowledge into skills. Defining the direction of this work, it is necessary to speak not about health education, and about hygienic training and education.

Hygienic training and education of the population in contrast to health education has its own characteristics, the main of which is the active nature of the activities.

Increasing the level of medical activity and literacy of the population – the most important task of the district physician-therapist and pediatrician (especially family doctor). An important part of medical and social activity is the installation of a healthy lifestyle (HLS).

A healthy lifestyle is a category of the General concept of "lifestyle", which includes favorable conditions for human life, the level of his culture, including behavioral and hygienic skills, allowing to maintain and strengthen health, contributing to the prevention of health disorders and maintaining an optimal quality of life.

A person's lifestyle includes ***3 categories***:

- standard of living;
- quality of life;
- –lifestyle.

The standard of living – the quantitative side of living conditions, the size and structure of material and spiritual needs of the population, consumption funds, incomes, housing, medical care, level of education, working and free time, etc. The standard of living – is primarily an economic category, representing the degree of satisfaction of material, spiritual and cultural values.

Quality of life – a category that includes a combination of life support and health conditions that allow to achieve physical, mental and social well-being and self-realization.

Lifestyle – the behavior of a particular person or group of people. Lifestyle is a sign of individuality, independence, the ability to build yourself as a person in accordance with your own ideas about a full and interesting life.

The first two categories are of a public nature. Therefore, it is clear that human health will primarily depend on the lifestyle, which is personalized and determined by historical, national traditions (mentality) and personal inclinations. Human behavior is aimed at meeting needs. With more or less the same level of needs, characteristic of the society, each person is characterized by its own, individual way to meet them, so people's behavior is different and depends primarily on education.

According to modern ideas, the concept of "healthy lifestyle" includes the following components:

- Rational organization of labor (educational) activity;
- The correct mode of work and rest;
- Rational organization of free time;
- Optimal motor mode;
- Rational nutrition;
- Compliance with the rules of personal hygiene, hardening;
- Compliance with the rules and regulations of psychohygienic;
- Sexual culture, rational family planning;
- Prevention of autoagression;
- Control over your health;
- Formation of interpersonal relations in labor collectives and families;
- Respect for the environment, nature;
- Conscious participation in preventive measures carried out by medical institutions, the implementation of medical prescriptions;
- Active participation in cultural activities, physical education and sports.

Great importance in the basis of the formation of a healthy lifestyle occupy personal motivational qualities of the person, his life guidance. No wishes, orders, punishments can force a person to lead a healthy lifestyle, protect and strengthen his own health, if a person does not consciously form his own style of healthy behavior.

Thus, a healthy lifestyle is a way of life, corresponding to genetically determined typological features of the person, specific living conditions and aimed at the formation, preservation and promotion of health and the performance of its socio-biological functions.

In order to preserve and restore the lost health, a person must make efforts for which a motive is needed, and the set of motives is motivation (motivation is an impulse that causes the activity of the organism and determines the direction of this activity).

What are the motivations behind the formation of a healthy lifestyle?

1. Selfpreservation.
2. The subordination of ethnic and cultural requirements.
3. Getting pleasure from self-improvement.
4. An opportunity for self-improvement.
5. Biological realization-healthy offspring.
6. Achieving the maximum possible comfort and independence, etc.

Thus, healthy lifestyle should be purposefully and constantly formed during a person's life, and not depend on circumstances and life situations. In this case, it will be a lever of primary prevention, strengthening and formation of health, will improve the reserve capacity of the body, to ensure the successful implementation of social and professional functions, regardless of political, economic and socio-psychological situations. HLS is the hygienic behavior basing on scientifically proved sanitary-hygienic standards, aimed at strengthening and preservation of health, activation of protective forces of an organism, ensuring a high level of disability, achievement of active longevity.

HLS can be considered as the basis for the prevention of diseases, the applied points of which are the elimination of risk factors: low level of labor activity, dissatisfaction with work, passivity, psycho-emotional tension, low social activity and low cultural level, environmental illiteracy, physical inactivity, irrational unbalanced diet, Smoking, alcohol, drugs and toxic substances, tense family relationships, unhealthy life, genetic risk, etc. The result of the reduction of the above factors is high labor activity, physical and mental comfort, active life position, strengthening the General condition of the body, reducing the frequency of diseases and exacerbations of chronic diseases.

Formation of HLS – is the creation of a system of overcoming risk factors in the form of active life of people aimed at maintaining and strengthening health.

In accordance with the orders of the Ministry of health promotion of healthy lifestyle is the responsibility of every health worker.

The concept of development of the health care system in Belarus until 2020 (extract): in order to ensure sustainable socio-economic development of the Republic, one of the priorities of the state policy should be the

preservation and strengthening of public health through the formation of a healthy lifestyle and improving the availability and quality of health care.

The objectives of health development are to promote healthy lifestyles, including reducing the prevalence of tobacco use to 25% and reducing alcohol consumption to 9 liters per year per capita.

The objectives of health care development are to create conditions, opportunities and motivation of the population to lead a healthy lifestyle.

To form a healthy lifestyle, it is necessary to introduce a system of state and public measures to:

1) improvement of health education and education of the population (especially children, adolescents and young people) through the media and the mandatory introduction of appropriate educational programs in pre-school, secondary and higher education institutions.

Within the specified direction it is necessary to carry out training in hygienic skills on observance of rules of hygiene of work, the mode of work (including study) and rest, the mode and structure of food, timely appeal for medical care and other norms of behavior supporting health;

2) creation of an effective system of measures to combat harmful habits (alcohol abuse, Smoking, drug addiction, etc.).

The system should include educating and informing the public about the consequences of tobacco use and alcohol abuse, promoting the reduction of tobacco and alcohol use, regulating and disclosing the composition of tobacco products and alcoholic products, and providing complete information about the composition on the package, protecting non-smokers from exposure to tobacco smoke, limiting alcohol consumption in public places, regulating the placement of places selling alcoholic beverages, tobacco and the order of their implementation, as well as price and tax measures;

3) creation of a system of motivating citizens to lead a healthy lifestyle and participate in preventive measures.

This should be ensured by popularizing the way of life and lifestyle that contributes to the preservation and strengthening of the health of citizens of the Russian Federation, the formation of a fashion for health especially among the younger generation, the introduction of a system of medical care for healthy and practically healthy citizens; conducting awareness-raising about the importance and need for regular prevention and;

4) creation of a system of motivating employers to participate in the protection of workers ' health through the establishment of benefits on insurance premiums for compulsory medical and social insurance, encouraging working groups to maintain a healthy lifestyle;

5) prevention of risk factors for noncommunicable diseases (blood pressure, malnutrition, hypodynamia, etc.);

6) creation of a system of motivation of heads of institutions of the school system to participate in the protection of health and healthy lifestyles of schoolchildren.

To form a healthy lifestyle, the following tasks will be solved:

- carrying out applied scientific and epidemiological studies to justify the improvement of legislation and methodological framework;
- ensuring interdepartmental cooperation and functioning of the coordination mechanism (including the organization of the activities of the state resource center);
- development of modern approaches and provision of conditions for training of specialists, improvement of educational programs, development of infrastructure of state scientific and educational institutions;
- organization and development of medical and preventive care through the introduction of modern medical and preventive technologies;
- organizational and methodological support of the activities of regional preventive organizations (centers of medical prevention), as well as primary health care institutions;
- development and implementation of state information and communication campaigns;
- organization of the vertical of interaction between the centers of medical prevention and prevention offices in the primary link;
- organization of health schools according to the main risk factors;
- development of conditions for healthy lifestyles, including monitoring and modern level of control (supervision) over the compliance of products intended for humans, as well as factors of the human environment to the requirements of the current legislation.

The objectives of this direction are:

1. Formation of ideology of healthy lifestyle among the population, strengthening of physical and spiritual health of the population.
2. Development of health-saving technologies, primary medical prevention and social medicine.
3. To reduce the likelihood and risk of the primary disease and morbidity of the population.

Objectives of the direction:

1. Organization and development of Health Centers on the basis of health institutions.
2. Improvement of activities in the practical sphere of primary medical prevention and monitoring of health indicators.

3. Development and practical implementation of the main directions of development and improvement of the regional service of preventive medicine.
4. Implementation of medical and social programs aimed at preventing the prevalence of socially related diseases.
5. Improvement and implementation of methodology of health saving and formation of healthy lifestyle of all population groups.
6. Improvement of health indicators and social and psychological rehabilitation of the population.
7. Creation of a network of social interaction and partnership, interagency cooperation.
8. Support for effective initiatives in municipal health, education, business and public sector.

In order to ensure the objectives of the formation of HLS provides for the implementation of the following activities:

- creation of mechanisms of interdepartmental interaction of the program executor;
- provision of comprehensive sectoral measures aimed at improving the level of knowledge of the population about a healthy lifestyle, organization of educational activities for the formation of a healthy lifestyle;
- creation and implementation of interdepartmental projects aimed at the formation of a healthy lifestyle and improvement of the population, the development of a system of medical prevention;
- increasing the role of primary health care in the formation of a healthy lifestyle through measures to increase the involvement of the population in physical culture, sports and tourism;
- improvement of the regulatory, legal, material and technical, organizational and management framework;
- support in the organization of rational nutrition for children in educational institutions;
- monitoring the implementation of the program, conducting sociological research among the population, the use of control systems of activities;
- organization of the system of prevention through the development of health Centers, medical prevention offices, offices of a healthy child;
- ensuring the availability of public knowledge about the state of health, measures to strengthen it, prevention of diseases;
- training the population to control their own health and the implementation of personal programs to strengthen it;
- development of a model and indicators of individual and public health, design of a system of monitoring of basic health indicators.

It is planned to assess the effectiveness of the above measures by the following target indicators:

- indicator of primary incidence of alcoholism;
- General mortality rate;
- mortality rate from cardiovascular diseases in working age;
- primary disability rate among persons of working age.

Well-organized promotion of medical and hygienic knowledge among the population helps to reduce morbidity and mortality, helps to educate a healthy, physically strong generation. World experience shows that the effectiveness of this preventive activity among the population is extremely high. Hygienic training and education of the population is quite a powerful tool for the formation of health, which is clearly seen in the example of a number of foreign countries.

The implementation of the tasks of hygienic training and education on the promotion of public health, of course, can not give immediate results. However, as the experience of a number of highly developed countries and the results of scientific research shows, the solution of these problems can lead within 5-10 years to a decrease in the prevalence of hypertension and tobacco Smoking by 20% and, as a consequence, to a decrease in morbidity, including temporary disability and mortality from cardiovascular diseases by 15 %, which is equivalent to saving lives annually about 25 thousand. a person of working age.

Improving the nutritional structure of the population and improving the quality of food products, along with an increase of 25-30% in the number of systematically engaged in physical education and receiving adequate exercise will reduce the prevalence of overweight by 25-30%, reducing morbidity and mortality from major NCDS by 10 and 5 % (respectively).

Reducing alcohol consumption and prevention of drug use will reduce the incidence of alcoholism by 15% and the loss of temporary disability and disability for diseases of General medical profile associated with alcohol abuse by 5%, as well as the incidence of somatic diseases due to toxic effects of alcohol and drugs by 25%, reducing injuries by 10-15 %.

Reducing environmental pollution to regulatory requirements will achieve a reduction in the overall morbidity by 10-15% and mortality by 5 %.

Economic analysis of the results of major prevention programs carried out both in our country and abroad, shows the high efficiency of hygienic training and education. Thus, the implementation of medical and social health promotion programs provides a ratio of cost and benefits. In schools, well-planned long-term HLS interventions aimed at preventing Smoking, unwanted pregnancies, sexually transmitted infections (STIs) and acquired immunodeficiency syndrome (AIDS), the cost-benefit ratio is 1:14. The same performance indicator can be obtained with the successful implementation of vaccine prevention programmes (e.g. measles, mumps,

rubella, diphtheria), in which the educational and training component is often crucial.

Principles of organization of hygienic training and education of the population:

- state character;
- planned character;
- mass character;
- participation of all health workers;
- participation of other organizations and the public;
- availability of special bodies and institutions of hygienic training and education;
- accessibility and focus;
- scientific character;
- differentiation;
- bullishness.

In order to implement the principles of hygienic education and training of the population, it is necessary to develop intra-sectoral and inter-sectoral cooperation.

Intra-sectoral cooperation is the interaction between health care institutions, centers of medical prevention, Departments of the state service for supervision of consumer rights protection and human welfare in the subjects of the Republic of Belarus, the district or family service of a medical organization, etc.

Inter-sectoral cooperation includes communication between bodies and institutions of education, social support of the population, culture and sports, the Department of internal Affairs, enterprises, public associations, the media (mass media), etc.

Prevention of socially caused diseases, NCDS, prevention of diseases of behavior and formation of healthy lifestyle among the population – activities that go beyond the health care system and involve in the solution of these tasks specialists in various fields, public associations, the media and the population. Therefore, building a partnership (intra – sectoral, inter-sectoral) is one of the key points for the success of hygiene education and training.

One of the main principles of the partnership is the involvement of participants at all stages of the process: in the planning, organization and implementation, evaluation of its effectiveness. The partnership provides not only an ideological partnership, but an investment in your overall work experience, time, pooling their financial resources, which can be aimed at prevention.

At the present stage, the Ministry of health of the Republic of Belarus sets a task for the regions to create a unified preventive environment at the

level of the subject of the Republic of Belarus. The formation of a single intersectoral preventive environment as a way to overcome the epidemic of non-communicable diseases should consist of several links:

- ensuring a safe and comfortable physical and social human environment;
- creating conditions for a healthy lifestyle;
- informing and motivating the population (taking into account age, sex, education) to preserve health and longevity, formation of responsibility for their health and the health of their loved ones;
- formation of health management system: timely identification of risk factors (medical examination and preventive medical examinations), individualized correction of risk factors.

A key partner of all health promotion and prevention activities is the population whose involvement and health education determine the success or failure of any programme. The population should participate in activities aimed at improving their health. It can be different kinds of lectures, conversations, evenings of questions and answers, questionnaires and opinion polls. The mass media (mass media) is one of the main ways to educate the population on health issues.

Hygienic training and education of the population is carried out by medical workers of departments (offices) of medical prevention of medical and preventive organizations, specialists of medical and preventive organizations (medical workers of district service, doctors-specialists, psychologists, doctors of preschool and school institutions, etc.). The subject of materials on hygienic training and education is determined in accordance with the tasks facing the medical organization. Various forms of work with the population are carried out in medical organizations, scientifically based new technologies, preventive and health programs are introduced.

Methods and means of hygienic training and education of the population and formation of a healthy lifestyle

The methods and means used by medical workers must comply with the basic principles of hygienic training and education and be training, visual, relevant, accessible, optimistic and have an educational function.

Classification of methods and means of hygienic training and education

Methods	***Means***
Oral	Lecture, conversation, advice, discussion, information speech on the radio, an evening of questions and answers, etc.
Print	Memo, leaflet, article in the newspaper, question and answer Board, slogan, book, brochure, wall sanitary printing, etc.

Visual	Posters, slides, natural objects, models, photos, albums, drawings, etc.
Mixed	TV, movies, exhibitions (fixed and mobile), parts of health, the coursework, theatrical performances, telecommunications, training.

The ***lecture*** is a mass means of hygienic training and education, characterized by the largest capacity of the information processed by the lecturer. For a short period of time, the lecturer should present a new, great material. Usually, a large audience is expected to give lectures.

The conversation involves the active participation of listeners. The task of the presenter is to make it interesting by leading questions, to involve listeners in the General conversation.

The evening of questions and answers requires preliminary preparation and good organization. The population is notified in advance of such an evening, questions from the population are collected in advance.

The ***Board of questions and answers*** is a form of correspondence consultations.

A memo is given to the patient to remind him of the doctor's advice. It is designed for a specific person, such as a memo to a patient suffering from diabetes, a memo on contraception, etc.

Wall sanitary press – wall newspaper of sanitary and educational subjects, which should be relevant, visual, and contain specific information.

Posters – a mass medium for health education, working scientists, artists, teachers, etc.

Along with traditional forms and methods of work, modern forms are used: schools, seminars, educational programs, health lessons, conferences, hotlines, training, health schools ("hypertension", "diabetes", "asthma-school", "hardening", "menopause", "breastfeeding", etc.). In medical organizations can be conducted sociological research, implemented preventive and health programs.

The content and subject matter of materials on hygienic training and education of the population are determined in accordance with the tasks and needs of the contingent served by the medical organization. For district health workers this may include: rules for the care of seriously ill at home, preventive measures in the hearth of infectious diseases, education about the need for preventive medical examinations, health examinations, vaccination, etc. For medical workers of departments and offices of medical prevention is carrying out various actions or decades in the medical organization. For example, a decade for the day of the elderly, including a set of activities: preventive examinations, lectures, demonstrations of video materials, etc.for medical workers of specialized services – is working with patients in the framework of specialized schools, distribution of information materials on the prevention of various diseases.

For the choice of means of hygienic training and education it is necessary to assess the situation. Each situation is characterized by four features.

Situations for the choice of means of hygienic training and education

Sign of the situation	***Grades of sign***
Quantitative composition of the audience	Groups of more than 20 people; Groups of less than 20 people; Individual.
Degree of extremeness of the situation	Extreme (epidemic situation); Not extreme.
Degree of homogeneity of the group	Homogeneous (by age, sex, diseases, profession) group; Heterogeneous group.
Level of readiness of persons to comply with hygienic rules	Desire to know (there is, there is no); Knowledge (Yes, no); The ability to perform (Yes / no); Persuasion-the ability to act correctly in a particular situation (there is no).

The choice of methods and means of hygienic training and education depends on the type of situation.

Types of situations for the choice of means of hygienic training and education

Feature combination	***Recommended hygiene training and education***
The group size is more than 20 people and the situation is not extreme	Lecture, school of health, film, TV.
The number of the group is more than 20 people and the extreme situation	A brief informational speech on the radio, lecture, radio, television, leaflet.
The group is heterogeneous	Conversation, discussion, evening of questions and answers, brochure.
The group is homogeneous	Course training, seminar, group preventive reception, memo, video.
Individual	Individual conversation, brochure, memo, direct training.

With a heterogeneous group, it is better to use such means by which you can interest the maximum number of participants in the event. For example, during a discussion, ask some participants questions to get their attention.

In a homogeneous group, mixed methods are used, United by one theme or printed information materials, designed for a specific target group.

Depending on the purpose, the structure of the group lesson is formed. If the purpose of the lesson is to provide new information, it is advisable to devote 40% of working time to the information block (lecture, conversation, answers to questions, visual materials, discussion, etc.), 55% of working time to devote to the consolidation of new information (games and exercises, quizzes, answers to questions, questionnaires, practical tasks, etc.), 5% of working time to distribute the acquaintance and completion of work. If the purpose of the lesson is to consolidate the knowledge, skills and abilities of the participants, the main time should be devoted to creating conditions for better assimilation of knowledge. If the goal is to develop practical skills, the main part of the lesson should be devoted to learning practical skills, games, exercises aimed at acquiring decision-making skills, finding a way out of a risky situation, skills failure in situations dangerous to health.

With the fifth type of situation, it is necessary to identify the level of readiness (the fourth sign) and, accordingly, use the means of training. For example, if there is knowledge, but there is no skill, it is necessary to teach practical techniques.

When choosing methods and means of hygienic training and education, it is necessary to remember that the degree of assimilation of the material is different in different forms of work.

Lecture (5% learning). The lecture is a quick way to provide the necessary information, but if the lecture is long and does not involve the active participation of the audience, it is ineffective. This form of work puts students in the position of passive listeners, so it is best to alternate lecture blocks with game, discussion, etc.

Reading (10% of the assimilated material). Individual or collective reading is a necessary method of learning, but, like a lecture, it does not allow to learn information deeply. It is effective only in combination with other ways of learning. You can use this method as a homework assignment.

Audio-visual AIDS (20% of the assimilated material). Demonstration of slides, films and videos makes the process of presenting information more interesting and colorful. Very effective in combination with other ways of learning. Efficiency will be higher if you use audiovisual means not only documentary, but also journalistic, artistic nature. The presenter needs to comment on the material during the show, explaining the problem points, or after viewing to conduct an analysis (to allow participants to ask questions

and answer them), if necessary, you can interrupt the view for comments and discussion.

Visual AIDS (30% of the acquired material). In the process of obtaining information, a person gives preference to certain sensory organs, some absorb the material perceived with the help of vision, others – with the help of touch or hearing. Using visual AIDS, you can help participants with different types of perception. Effectively using the participants own drawings on the Board or flipchart.

Group discussion (50% of the material learned). This is an oral exchange of views between the participants. The discussion deepens the understanding of the material and provides participants with the opportunity to use the knowledge gained. The most common forms of group work are discussion and brainstorming. During the discussion, sometimes, especially when discussing controversial issues, the parties do not reach unanimity, but at the same time value attitudes are formed, new facts are remembered, which can subsequently affect the behavior of participants. No matter how the discussion takes place, it is possible to find common positions and develop joint solutions. "Brainstorming" involves the participation of each member of the group in solving a common problem. By asking a question, the presenter records all incoming answers. After that, the received proposals are grouped by semantic content. Then there is an assessment and analysis of the ideas and proposals.

Training in the practice of action (70% of the acquired material). Participants are invited to present themselves in a role in solving life situations. Topics for business games can be different, but you should not copy the life situations that took place in the real life of the participants. In a business game, participants play the role of a character, not their own, which is less embarrassing for people when they need to Express their feelings, emotions, speak out on certain issues. Playing someone's role, the participant can learn more about their desires, aspirations, habits, behavior, see the situation through the eyes of another person.

Acting as a teacher (90% of the acquired material). Anyone who introduces information to others, he learns 90% of the taught material. This form of work is most effective among adolescents and is used in the training of volunteers.

An important component of medical and hygienic education and education is consultative and health care-a type of medical care, including the provision of medical, information and educational services, the issuance of recommendations aimed at disease prevention and health promotion, as well as consulting professionals involved in the management and treatment of the patient.

Consultant-specialist with higher medical or non-medical (e.g. education, having special additional training and experience, allowing to

assess the state of health of the patient and to predict its development, to advise, to train patients and medical workers, to provide medical services and to develop programs of carrying out medical and improving actions and to estimate their efficiency, to make adjustments in medical and diagnostic process.

The purpose of consulting and health care is to provide the maximum possible assistance to patients in reducing the impact of modulated risk factors, prevention of diseases and their consequences through individual preventive counseling. This goal is achieved through the formation of a certain relationship between the specialist consultant and the patient. The model is similar to the relationship may be the interpretation in which the specialist plays the role of counselor, providing help to the patient in achieving the objectives, or information, in which the specialist provides the patient with all available information concerning his condition.

The content of recommendations for patients in preventive counseling:

When identifying risk factors, the patient should be informed about their negative impact on health and the course of existing diseases.

Elevated blood pressure can be a manifestation of an independent disease and a risk factor for CVD due to atherosclerosis. Even with a single detected increase in blood pressure, it is necessary to inform the patient about the need to control blood pressure and, especially, self-control at home. Recommend to buy a home tonometer, periodically measure blood pressure regardless of health and record the result. Discuss with the patient the risk factors that contribute to the increase in blood pressure, pay attention to heredity, comorbidities. It is necessary to give advice to quit Smoking if the patient smokes, reduce excess body weight, limit salt intake, exclude alcoholic beverages (limit consumption). It is recommended to re-measure blood PRESSURE, follow the recommendations and if necessary, medication.

All patients with increased blood pressure should be examined in accordance with the standard to clarify the diagnosis. In the presence of indications for dispensary observation of the patient it is necessary to inform on volume and frequency of its carrying out and to motivate to its passing.

Irrational (unhealthy) food

This factor is associated with such biological risk factors as overweight (obesity), high blood pressure, hypercholesterolemia, dyslipidemia, hyperglycemia. As part of a brief consultation, patients with isolated risk factors "poor nutrition" should receive advice on healthy eating:

- balanced diet in terms of energy and energy consumption to maintain optimal body weight and essential nutrients (proteins, fats, carbohydrates, trace elements, vitamins);

- restriction of salt consumption (no more than 5g per day – 1 teaspoon without top),"free" sugars;
- limit animal fat with partial replacement by vegetable fats;
- consumption of 2-3 times a week of fatty sea fish;
- daily consumption of 400-500g of fruits and vegetables (excluding potatoes);
- the preferred consumption of whole grain products (bread, cereals).

Excess body weight (obesity):

- inform about target body mass levels to reduce the risk of disease;
- recommend a reduction of the caloric content of the diet and weight control at home;
- encourage the patient to self-assess your daily diet and physical activity;
- explain that reducing overweight requires the patient's own volitional efforts;
- to explain the danger of reducing body weight by applying a variety of "fashionable" diets, especially starvation.

Oral advice should be accompanied by written recommendations in the form of memos, short brochures, leaflets and, if necessary, address the patient to reliable sources of information on the Internet.

Patients with overweight, expressing a desire to reduce body weight, should be sent to the office (Department) of medical prevention, if possible, consult a dietitian. Patients with obesity, especially with severe obesity, should be consulted by a dietitian and, if necessary, an endocrinologist.

Hypercholesterolemia (dyslipidemia):

- to inform about the target levels of total cholesterol, lipid fractions. Caloric content of food should maintain optimal body weight (for a particular patient). Limit the consumption of fat (including vegetable fats), the proportion of which should not exceed 30% of the daily caloric content (with a significant excess body weight - up to 20%);
- it is recommended to reduce the consumption of foods rich in saturated fats and cholesterol (fatty meat, poultry with skin, whole dairy products, chocolate, pastries containing fats, egg yolks and fats themselves-fat, butter, margarine, coconut oil, palm oil);
- limit cholesterol-rich foods (egg yolks, offal, brains, liver, kidney, heart, butter, animal fats, and cheese, sour cream, sausages, and high-fat sausages);
- saturated (animal) fats should be no more than half of the daily requirement-about 25-30g/day;

- preference should be given to products rich in polyunsaturated and monounsaturated fatty acids, which are also contained in fatty fish varieties;
- recommended consumption of sea fish 2-3 times a week for 100-150g in the form of a variety of dishes;
- useful soluble dietary fibers-pectins, which bind in the intestine of cholesterol and remove it from the body.

Hyperglycemia:

- to inform about the target blood glucose levels on an empty stomach, after a meal. It is recommended to limit simple carbohydrates and animal fats, reduce excess body weight, control blood PRESSURE. In the presence of a history of increases in blood glucose to conduct a full examination of the patient in accordance with the standards of medical care, the indications to send the patient for consultation to the endocrinologist;
- it is necessary to control the level of blood glucose (recommend to control the level of glucose in the health center, the office of medical prevention or at home – to buy a household glucometer).

Tobacco use / Smoking:

- inform about the risk of diseases due to Smoking;
- tobacco Smoking is one of the most dangerous risk factors for cardiovascular, bronchopulmonary, oncological and other chronic diseases;
- passive Smoking is as harmful as active Smoking;
- there are no safe doses and harmless forms of tobacco use. So-called "light" and thin cigarettes are also harmful to health;
- Smoking cessation will be beneficial for health at any age, regardless of the "experience" of Smoking;
- if a smoker smokes the first morning cigarette within the first 30 minutes after lifting, it is necessary to inform him about the high risk of nicotine addiction, which is regarded as a disease and requires medical care, explain the need to contact the office for assistance in Smoking cessation (office of medical prevention);
- at the unwillingness of the patient to quit Smoking, to repeat the Council, give notice and to recommend when this desire to ask for medical advice on quitting Smoking;
- provide information on the mode of operation of the office of medical prevention or office of medical care for Smoking cessation.

Low physical activity:

- inform the patient that the minimum physical activity required to maintain health is walking at a moderate pace for at least 30 minutes a day most days of the week. Healthy people should be recommended to engage in physical culture and sports.

Suspicion of harmful alcohol consumption:

- inform the patient that he / she has a suspicion and risk of excessive (harmful) alcohol consumption;
- inform about the negative impact of alcohol on health, the course of diseases, etc. (depending on the specific situation);
- if possible (time), ask the patient about his / her attitude to his / her own drinking habits and willingness to reduce this consumption;
- give a memo;
- if you suspect the presence of addiction advise to seek help from a narcologist.

Suspected harmful use of drugs and psychotropic substances:

- inform the patient about the identified risk factor;
- evaluate the patient's attitude to drug use;
- try to motivate to refuse;
- to recommend to address to the psychiatrist.

Psycho-emotional stress:

- inform about the risk of diseases;
- to normalize the everyday regime of work and rest;
- provide night sleep for at least 7-8h;
- use weekends and holidays for a good rest;
- regularly use a vacation;
- to enter into the regime of regular moderate exercise;
- master relaxation techniques (breathing training, auto-training, etc.).

If the above methods of reducing psycho-emotional stress are ineffective, it is necessary to recommend the help of a specialist psychologist or psychotherapist.

In clinically significant anxiety and depressive disorders, drug therapy is recommended.

Health and hygiene education in different population groups

In order to better inform the population, hygienic education and training is carried out in different target groups:

- by age structure (children in kindergarten, pupils and pupils, students, etc.);

– social status (working, retired);
– professional characteristics (employees of industrial enterprises, decreed groups of the population, employees of security services, etc.);
– the presence of diseases (hypertension, diabetes, diseases of the gastrointestinal tract, etc.).

The formation of target groups is advisable, because it uses similar forms and methods of preventive effects: for example, specialized schools for patients with diabetes, hypertension, etc.

The information is presented taking into account the age, level of education, the presence of certain risk factors. When working with the population at all levels, the information is available to the General public, without the use of complex medical terms, is positive.

Hygienic education in preschool institutions. Preschool age is the period of the most intensive mental and physical development of a person. His health, mental capacity and moral qualities are largely dependent on the social and hygienic conditions created during the period of development in early childhood. Hygienic education of preschool children is closely connected with the General problems of education. Parents, medical workers and teachers of preschool institutions, doctors and nurses of children's polyclinics should be engaged in hygienic education of preschool children. Its main objectives are: to create optimal conditions for the environment for the proper physical and mental development of the child; the formation of conscious and strong hygienic skills and appropriate hygienic behavior that contribute to health; hygienic preparation of children of the senior group to school.

In the pre-school age, children are provided with knowledge and hygiene skills and habits aimed at disease prevention, protection and promotion of health.

All information is given with gradual complication from one age group to another. Hygiene education should be targeted. It is important to eliminate the spontaneous formation of skills and habits, in which they are often fixed incorrectly, so adults should promptly teach the child hygiene techniques.

When working with children, it is necessary to take into account the peculiarities of age: for preschool children, you should use games, fairy tales, colorful pictures to instill hygienic skills.

Valeological education of preschool children

In early preschool age	***In the middle preschool age***	***In the senior preschool age***

on the development of ideas about their external age;	on the development of ideas about your body: a) senses; b) respiratory and digestive systems;	on introduction and norms of a healthy lifestyle;
the development of skills and abilities of their personal hygiene;	the development of ideas about a healthy lifestyle for yourself and your family.	enrichment of ideas about health, about the body, its needs, about ways to prevent injuries, hardening.
the development of ideas about belonging to the female and male sex, the behavior of boys and girls;		
to develop a positive attitude to yourself and your name.		

Hygienic training and education of schoolchildren consists of classroom, extracurricular and extracurricular activities carried out by teachers of all subjects, medical staff of institutions, heads of clubs, clubs, associations. Classroom work is conducted in accordance with educational standards, curricula, guidelines. Basically, the issues of hygiene are covered in the process of teaching natural science, the basics of life safety, labor, physical culture, natural science, biology (educational institutions), as well as labor protection, safety (educational institutions with vocational training). Extracurricular work includes: classes in the electives and in the circles of "Young medic", interviews, lectures, medical staff, individual consultation, viewing of films and videos. However, more effective is the organization of game (especially in the lower grades) and competitive forms of education and training: quizzes, competitions, theatrical performances, shows, competitions with the obligatory participation of high school students in programs for younger students, the release of sanitary bulletins, leaflets.

For high school students a good way of learning and education is the organization of conferences, debates, round tables. A powerful means of hygienic education is the participation of schoolchildren in the work of clubs, public associations of hygienic and environmental topics. In work with students, you can use their knowledge of hygiene, natural science, biology, anatomy, to involve teachers.

Work with women, pregnant women, mothers is aimed at explaining the hygiene of sexual life, preparation for motherhood, training in contraception (for example, "School of breastfeeding", "School of family planning", etc.).

Work with the contingent of industrial enterprises is aimed at familiarizing them with the issues of occupational health (noise control,

welding aerosols, dust, etc.) personal hygiene (prevention of skin diseases) and the use of General and individual protection.

In rural areas, the work is aimed at familiarizing the population with the rules of work with chemical fertilizers, pesticides, clarification of the importance of timely vaccination against tetanus, the importance of disinfection, etc.

Work with patients also requires certain rules: it is necessary to take into account the peculiarities of the psyche of the patient, increased interest in their disease.

One of the ways of forming a partnership between doctor and patient is educating patients in the health Schools.

School for patients - a set of tools and methods of individual and group impact on patients and the population, aimed at improving their knowledge, awareness and practical skills for the rational treatment of the disease, prevention of complications and improve the quality of life.

The purpose of the Schools is to teach the patient to maintain health, reduce the manifestations of the existing disease and reduce the risk of complications, increase motivation and improve patient compliance with medical recommendations, the formation of partnerships with the doctor in the treatment, rehabilitation and prevention, their mutually beneficial cooperation. When visiting these schools, patients are formed responsible for maintaining their health, rational and active attitude to health, motivation to recovery, compliance with the treatment regime.

Belarus has accumulated experience of health Schools for patients with various chronic diseases. Successfully conducted sessions with patients with hypertension, diabetes, asthma, coronary heart disease, heart failure, gastroscopy, threescore, school of active longevity and some others. The accumulated experience shows the high economic efficiency of this strategy. Carrying out educational programs among patients can reduce the number of patients with severe diseases, the frequency of visits to the doctor and the number of hospitalizations, reduce the loss of temporary disability and disability, reduce mortality, improve the quality of life of the patient and develop his right attitude to his illness and treatment.

Health schools, schools for patients and people with risk factors are an organizational form of training for target groups on priority issues of health promotion and preservation. The main purpose of such schools is to form a certain culture of attitude to health promotion, disease prevention, taking into account potential and existing problems.

The priorities of the health schools are:

– raising awareness of certain groups of the population in matters of public and private health and the degree of influence of environmental factors and other risks on it;

- the formation of the responsibility for the health and determine the degree of participation of the health care system in maintaining and promoting health;
- improving the level of knowledge, skills and abilities for self-control of health and assistance to yourself in cases that do not require medical intervention;
- creation of motivation for a healthy lifestyle and prevention of deviations and complications in the state of health, disability and maladaptation in society;
- formation of adequate health behavioral reactions and health-saving technologies;
- involvement of other interested organizations and specialists in the issues of preservation and promotion of health;
- reduction of non-core load on institutions and specialists of primary health care.

Regulatory and legal regulation

When organizing a School of health for patients in a health care institution, the following documents are formed:

1. Orders of the Ministry of health of the Republic of Belarus on measures to improve the organization of medical care for patients with various diseases and conditions.
2. The order of the chief physician of muses about the organization of work of School of health in muses.
3. Regulations on the organization of the School of health.
4. Criteria for assessing the effectiveness of the School of health.
5. Questionnaire for conducting a survey of students before and after the training cycle.

Principles of organization of health Schools:

- sent to School sick, not trained (primary cycle) or patients already trained in re-cycle (maintenance cycle). The number of patients in the group of no more than 8-10 people;
- classes at the School are cyclical and conducted in an interactive form. The full cycle of study at the School consists of 6-8 classes of 90 minutes;
- the duration of training of patients is usually 1-2 months;
- frequency of classes-1-2 times a week;
- duration of classes 1-1,5 hours.

The structure of the classes:

1. 20-30% – lecture material;
2. 30-50 % – practical training;
3. 20-30 % – answers to questions, discussion, discussion;

4. 10 % – individual counseling.

Group equipment:

- classes are held in groups of 8-10 people;
- the contingent of listeners for occupations at School of health is selected by the doctor (paramedic) on the basis of data of the anamnesis, results of clinical and tool and biochemical researches taking into account age, a state of health and the accompanying diseases;
- the recruited group of patients is a "closed group", i.e. new patients do not join it during the training;
- exclusion criteria: impairment of cognitive functions; presence of acute or chronic diseases in the acute stage; presence of chronic diseases in the decompensation stage.

Depending on the profile of the School of health to conduct classes in Schools actively involved doctors of different specialties, nurses, psychologists and other professionals. In recent years, a significant place is given to secondary medical personnel in conducting classes in Schools. They conduct practical classes, teach patients the rules of tonometry, methods of first aid, the rules of keeping a diary of self-observation, individually determine the risk factors, conduct testing of patients. After classes, fill out a leaflet in the outpatient card, a log of classes, record the presence of risk factors for each patient studied to assess the effectiveness of the classes.

Thus, in the target population groups identical methods and means of work are used and common tasks of hygienic training and education are solved.

Prevention of diseases in the family in recent years has become particularly relevant in connection with the development of the system of General medical practice. The place of the General practitioner in the health care system is unique-he directly communicates with the patient and his family, takes responsibility for the health of the observed, provides treatment and prevention, involving the most modern achievements of medical science, coordinates the efforts of all health services.

Example of case problem. The man is 39 years old, works as the head of Department in construction company, work responsible, is connected with communication with people, negotiating, generally sedentary, the working day abnormal. Heredity: parents with 40–50 years, – hypertension, grandfather on the maternal side – diabetes mellitus 2. From his youth he played sports: running, skiing, soccer, Boxing. Recently been irregularly against the background of what has gained weight на10кг for the last 3years. Caloric intake – high. Smokes on 15 cigarettes in day. Moderately uses weak and strong alcoholic beverages 2-3 times a week. Height 176cm, weight 98kg.

Results: General blood test within normal limits; Biochemical blood test: OHS – 6.62 mmol/l, glucose – 4.9 mmol/l.

Task: 1.What are the risk factors for the development of diseases?

2.Is the patient recommended to attend a health school?

3.What to give the patient recommendations for a healthy lifestyle?

Decision. In such tasks, the student should:

- answer all questions, thus identifying all the risk factors for this particular patient,
- on the basis of the conditions of the problem, the patient should be recommended to attend schools of health according to his illness
- You also need to give the patient specific recommendations regarding changes in his lifestyle, i.e. in each task, explain what ***methods***, ***means***, and ***in what form*** You will involve the patient in a healthy lifestyle.

TASKS FOR SELF-ACCESS WORK

Option 1. On a therapeutic site practically healthy woman K. lives. She is 25 years old. The patient smokes from 22 years till 8-10 cigarettes in day. Develop methods and tools of medical-hygienic training of the population and formation of a healthy lifestyle which the attending doctor can use.

Option 2. On treatment in gastroenterological department of hospital there is patient D. 52 years old, suffering a cirrhosis of a liver. The patient abuses alcohol. Develop methods and tools of medical-hygienic training of the population and formation of a healthy lifestyle which the attending doctor can use.

Option 3. Under supervision the local obstetrician-gynecologist of female consultation has a pregnant woman A. 20 years old. Pregnancy proceeds normally. The woman smokes from 16 years up to 10 cigarettes in day. Develop methods and tools of medical-hygienic training of the population and formation of a healthy lifestyle which the attending doctor can use.

Option 4. On a pediatric site the child of 12 years old who smokes from 10 years on 2-3 cigarettes in day lives. His parents and the senior brother of 24 years old smoke and abuse alcoholic drinks. Develop methods and tools of medical-hygienic training of the population and formation of a healthy lifestyle which the attending doctor can use.

MEDICAL STUDENTS PRACTICE

Medical practice of students of the 5th course in the discipline "Public health and health service" takes place in specialized hospitals of regional, city and large Central district medical organizations during working hours of doctors under the guidance of a University teacher, head of Department and under the supervision of a specialist (Deputy chief physician), fixed by order of the chief physician.

The main purpose of medical students practice – deepening, consolidation and verification of knowledge and practical skills acquired by students in the study of the discipline "Public health and health", their further improvement.

Practice objectives:

Deepening of theoretical knowledge on public health and health care obtained at other departments.

Development and consolidation of practical skills of the doctor in the specialty "Public health and health service".

Familiarization with the organization of medical business: diagnosis, treatment, rehabilitation and prevention; working conditions of doctors at all stages of medical care.

The development of technology in the development of proposals for the improvement of health care organizations.

Consolidation of practical skills in medical and hygienic training and the formation of a healthy lifestyle in the population.

During the work on all cycles of practical training ***students should***:

- to get acquainted with the organization of health care in the city, district and village;
- to get acquainted with the structure and organization of work of employees of the territorial medical Association, city hospital, polyclinic, maternity hospital and women's consultation;
- to study the preventive principle of health care, dispensary method and its essence;
- to examine medical records and its maintenance, the rules of formatting and encoding of a leaf of invalidity.

During the internship, students perform an individual task, which provides a detailed study of one of the six sections:

1. *Organization of therapeutic outpatient care.*
2. *Organization of in-patient therapeutic care.*
3. *Organization of surgical outpatient care.*
4. *Organization of inpatient surgical care for the population.*

5. *Organization of medical services for the female population (women's consultation).*
6. *Organization of in-patient obstetric and gynecological care.*

Working on an individual task, students consolidate their knowledge and show their skills in the analysis and evaluation of medical organizations, Express their proposals of a managerial nature to improve the various aspects of the activities of medical organizations, taking into account the specific conditions.

CONTENT OF PRACTICE:

1. When studying the organization of ***therapeutic or surgical outpatient care*** to the population, attention is drawn to the principles of its organization, the structure of the clinic, the functional duties of the head of the Department, the district physician; preventive and anti-epidemic work, work on the medical examination of the population, health indicators. Students work with accounting and reporting documentation.

Based on the data obtained in the office of medical statistics, students calculate: indicators of General morbidity, frequency of injuries, morbidity with temporary disability, primary disability, rehabilitation of disabled people, immunization of the population, the incidence of acute intestinal infection, the percentage of hospitalization, the effectiveness of medical examination. Indicators of defects: complaints of the population, deaths at home, identification of patients with advanced forms of disease. All figures are calculated for 2 years. Then the evaluation of the medical organization on the basis of the model of final results is carried out.

The indicators are analyzed in comparison with the known normative values and proposals are made to improve the activities of a particular treatment and prevention organization.

2. When studying the organization of ***in-patient therapeutic or surgical care*** to the population, attention is drawn to the structure of the hospital, the organization of the Department, the functions of the head of the Department and the resident doctor, activities for the prevention of nosocomial infections, the formation of a healthy lifestyle (HLS), the study of health indicators, Students work with the accounting and reporting documentation of the Department.

On the basis of the data obtained in the office of medical statistics, students calculate the indicators of the use of the bed Fund (the average number of days of the bed in a year, the length of stay of the patient on the bed, the turnover of the bed) and the quality of medical care: the level of quality of treatment, the distribution of discharged patients according to the results of treatment, surgical activity; indicators of defects: divergence of clinical and pathological diagnoses, mortality, postoperative mortality, postoperative complications, reasonable complaints of the population. All figures are calculated for 2 years. The performance of the organization is then evaluated on the basis of the outcome model. The report ends with an analysis of the results in comparison with the known normative values for the country and the conclusions, writing proposals to improve the activities of this health organization.

3. In the study of the organization of the ***antenatal clinic*** assessed the health indicators of the population. Attention is drawn to the structure of the women's consultation, the functions of the head of the Department and the district doctor of obstetrician-gynecologist, dispensary observation of pregnant women and gynecological patients, patronage work of the midwife. Students work with accounting and reporting documentation, participate in the work on hygienic education of the population and the formation of healthy lifestyle.

Based on the data of the Cabinet of medical statistics, students calculate the performance indicators: early pregnancy, the proportion of premature birth, the incidence of TD, the frequency of abortion; indicators of defects: perinatal mortality, maternal mortality, reasonable complaints, the number of patients with advanced forms of cancer. All figures are calculated for 2 years. The activities of the consultation are then evaluated on the basis of the MD. The study of the organization of the work of the women's consultation is being completed with the analysis of indicators and the development of proposals for improvement.

4. When studying the organization of the ***obstetric and gynecological hospital***, the structure of the maternity hospital, the functions of the head of the Department and the resident doctor are presented, measures for the prevention of infection among newborns and puerperas are studied; attention is paid to the continuity in the work of the women's consultation, maternity hospital and children's polyclinic, the health indicators of the population are evaluated. Students work with accounting and reporting documentation.

On the basis of the data of the Cabinet of medical statistics, students calculate the performance indicators: perinatal mortality, early neonatal mortality, infant mortality, average duration of the bed in a year, the incidence of newborns; indicators of defects: maternal mortality, nosocomial septic infection of puerperas, postoperative mortality, postoperative complications, daily mortality of women, newborns, neonatal morbidity in the first 10 days. All figures are calculated for 2 years. The hospital is then evaluated on the basis of the MD. The study of the organization of work of the maternity hospital is completed by the analysis of indicators, conclusions and proposals to improve the work of this health organization.

PROGRAM FOR UNDERGOING SUMMER PRACTICAL TRAINING ON DISCIPLINE «PUBLIC HEALTH AND HEALTH SERVICE»

Section 1. Organization of therapeutic outpatient care

General information on the polyclinic and health indicators of the population

Principles of medical care of the population. The basic orders governing the activities of the clinic.

Tasks, structure and capacity of the clinic. Scheduling. Organization and working conditions of doctors and nurses. Staff therapeutic services clinic: primary care physicians, heads of therapy departments and district nurses, security, staffing, % concurrently, the load of doctors. The number of medical sites, the average population in one therapeutic area. Medical services: types and volume in the clinic. Medical support, financing of the polyclinic.

Medical and demographic indicators in the area of polyclinic service. Number of served population, mortality, general morbidity.

Registry: its functions, basic documentation, regulation of the flow of patients applying for admission.

Departments of prevention and medical rehabilitation.

Day care department, organization and principle of work.

Continuity in the activities of outpatient services with other health organizations. Accounting and reporting medical records used when working in the hospital.

Management function of the head of the therapeutic Department of the polyclinic. Organization and participation in consultations, consultations, clinical, clinical and pathological conferences. Training with doctors, nurses to improve their skills. Certification of doctors, nurses, qualification categories.

Functions of the district physician, his schedule. Dispensary work of doctors, groups of dispensary observation.

Anti-epidemic actions in policlinic and the documents regulating an order of their implementation. Functions of the infectious disease room. Control over compliance with sanitary and hygienic, anti-epidemic regime.

Duties of the attending physician, the head of Department, the Deputy chief physician on medico-social examination and medical rehabilitation in the organization of work on examination of temporary disability.

Organization of work and functions of the medical Advisory Commission on medical rehabilitation and examination of working capacity. Regulations on the examination of temporary disability and rehabilitation in the hospital. Documents regulating the procedure for issuing certificates of

incapacity for work and certificates of temporary incapacity for work. The procedure for issuing documents certifying temporary disability.

The main tasks of the medical rehabilitation Commission. Documents regulating the procedure of medical and social examination of permanent disability.

Accounting and reporting documentation used to study different types of morbidity.

Assessment of the quality of medical care provided to the population. Accounting and reporting documentation used when working in the clinic to study various types of disease.

Quality standards (Temporary protocols) of diagnosis and treatment of patients, as well as indications for consultation and hospitalization.

The results of the study of patient satisfaction with the quality of care.

Medical and hygienic training, education of the population and the formation of a healthy lifestyle.

Performance indicators and defects characterizing the activities of the clinic for 2 years

Calculate, compare and draw conclusions performance indicators and defects that characterize the activities of the surgical Department of the hospital for 2 years.

Assessment of health organization performance based on the outcome model

Calculate the model of the final results of the health organization (Department).

Analysis, conclusions and suggestions

To carry out the analysis of indicators of activity of the organization of health care in comparison with the known normative values, levels for the reporting year or in dynamics. To make proposals to improve the activities of a specific treatment and prevention organization and the health care system as a whole.

Section 2. Organization of in-patient therapeutic care for the population

General information on the hospital and health indicators

Principles of medical care of the population. The main orders regulating the activities of the hospital.

The structure and capacity of the city hospital, its medical and diagnostic departments and units, the number of beds. Tasks of the city hospital. Scheduling. Staffing, security, staffing, % compatibility, load of doctors. Medical services: types and volume in the hospital. Medical support, hospital funding.

Structure, functions, documentation, admissions, procedure of admissions, emergency and urgent care patients.

The main departments of therapeutic profile, their role in the diagnostic and treatment process. Brief description of the therapeutic Department: number of beds, wards, availability of auxiliary rooms, equipment of the Department.

Organization and working conditions of doctors and nurses. Internal labor regulations for employees, internal regulations for patients. Organization of care for the seriously ill. Organization of medical nutrition. Anti-epidemic measures carried out by the hospital. Prevention of nosocomial infection, regulating documents.

Continuity in the activities of the hospital with other health organizations. Accounting and reporting medical records used when working in the hospital.

Day hospital stay, organization and principle of work.

Management function of the head of the Department. Organization of consultation, counseling, clinical, clinical-pathoanatomical conferences, studies with doctors, middle medical workers on professional development. Certification of doctors, nurses, qualification categories.

Functions of the resident doctor, his schedule, participation in the diagnostic and treatment process. Control over the observance of sanitary and hygienic measures on the fixed area of work.

Functions of the head nurse. The activities of ward nurses on the implementation of doctor's appointments and control over the observance of sanitary-hygienic, antiepidemic and medical protective regime in the hospital.

Duties of the attending physician, the head of Department, the Deputy chief physician on medico-social examination and medical rehabilitation in the organization of work on examination of temporary disability.

Organization of work and functions of the medical Advisory Commission on medical rehabilitation and examination of working capacity. Regulations on the examination of temporary disability and rehabilitation in the hospital. Documents regulating the procedure for issuing certificates of

incapacity for work and certificates of temporary incapacity for work. The procedure for issuing documents certifying temporary disability.

The main tasks of the medical rehabilitation Commission. Documents regulating the procedure of medical and social examination of permanent disability.

Accounting and reporting documentation used to study different types of morbidity.

Assessment of the quality of medical care provided to the population by structural units and the hospital as a whole. Quality standards (Temporary protocols) of diagnosis and treatment of patients, as well as indications for consultation and hospitalization.

The results of the study of patient satisfaction with the quality of care.

Medical and hygienic training, education of the population and formation of a healthy lifestyle.

Performance indicators and defects characterizing the activities of the therapeutic Department of the hospital for 2 years

Calculate, compare and draw conclusions performance indicators and defects that characterize the activities of the therapeutic Department of the hospital for 2 years.

Assessment of health organization performance based on the outcome model

Calculate the model of the final results of the health organization (Department).

Analysis, conclusions and suggestions

To carry out the analysis of indicators of activity of the organization of health care in comparison with the known normative values, levels for the reporting year or in dynamics. To make proposals to improve the activities of a specific treatment and prevention organization and the health care system as a whole.

Section 3. Organization of surgical outpatient care

General information on the polyclinic and health indicators of the population

Principles of medical care of the population. The basic orders governing the activities of the clinic.

Tasks, structure and capacity of the clinic. Scheduling. Organization and working conditions of doctors and nurses. The staff of the surgical service of the clinic, security, staffing, % compatibility, load of doctors. Number of medical stations.

Medical services: types and volume in the clinic. Medical support, financing of the polyclinic.

Medical and demographic indicators in the area of polyclinic service. Number of served population, mortality, General morbidity.

Registry: its functions, basic documentation, regulation of the flow of patients applying for admission.

Department of prevention and medical rehabilitation.

Day hospitals and hospitals at home, organization and principle of work.

Anti-epidemic measures, in the clinic, the regulatory documents.

Continuity in the activities of outpatient services with other health organizations. Accounting and reporting medical records used when working in the hospital.

Management function of the head of the surgical Department of the polyclinic. Organization and participation in consultations, consultations, clinical, clinical and pathological conferences. Training with doctors, nurses to improve their skills. Certification of doctors, nurses, qualification categories.

The functions of the local doctor's surgery, a timetable for its work. Dispensary work of doctors, groups of dispensary observation.

Preventive and anti-epidemic work in the clinic, the functions of the infectious diseases office. Control over compliance with sanitary and hygienic, anti-epidemic regime

Duties of the attending physician, the head of Department, the Deputy chief physician on medico-social examination and medical rehabilitation in the organization of work on examination of temporary disability.

Organization of work and functions of the medical Advisory Commission on medical rehabilitation and examination of working capacity. Regulations on the examination of temporary disability and rehabilitation in the hospital. Documents regulating the procedure for issuing certificates of incapacity for work and certificates of temporary incapacity for work. The procedure for issuing documents certifying temporary disability.

The main tasks of the medical rehabilitation Commission. Documents regulating the procedure of medical and social examination of permanent disability.

Accounting and reporting documentation used to study different types of morbidity.

Assessment of the quality of medical care provided to the population. Quality standards (Temporary protocols) of diagnosis and treatment of patients, as well as indications for consultation and hospitalization.

The results of the study of patient satisfaction with the quality of care.

Medical and hygienic training, education of the population and the formation of a healthy lifestyle.

Performance indicators and defects characterizing the activity of the surgical Department of the polyclinic for 2 years

Calculate, compare and draw conclusions performance indicators and defects that characterize the activities of the surgical Department of the clinic for 2 years.

Assessment of health organization performance based on the outcome model

Calculate the model of the final results of the health organization (Department).

Analysis, conclusions and suggestions

To carry out the analysis of indicators of activity of the organization of health care in comparison with the known normative values, levels for the reporting year or in dynamics. Make proposals to improve the performance of a particular organization and the health system as a whole.

Section 4. Organization of inpatient surgical care for the population

General information on the hospital and health indicators

Principles of medical care of the population. The main orders regulating activity of the hospital.

The structure and capacity of the city hospital, its medical and diagnostic departments and units, the number of beds. Tasks of the city hospital. Scheduling. Staffing, security, staffing, % compatibility, load of doctors. Medical services: types and volume in the hospital. Medical support, hospital funding.

Structure, functions, documentation, admissions, procedure of admissions, emergency and urgent care patients. The procedure for providing assistance to trauma patients.

The main departments of surgical profile, their role in the diagnostic and treatment process. Brief description of the surgical Department: the number of beds in the Department, wards, the presence of operating, dressing, auxiliary rooms, compliance with sanitary and epidemiological regime, equipment Department. Allocation of "clean" and "purulent" departments.

Organization and working conditions of doctors and nurses. Internal labor regulations for employees, internal regulations for patients. Organization of care for the seriously ill. Organization of medical nutrition. Anti-epidemic measures carried out by the hospital, prevention of WBI, regulatory documents.

Continuity in the activities of the hospital with other health organizations. Accounting and reporting medical records used when working in the hospital.

Day hospital stay, organization and principle of work.

Management function of the head of the Department. Organization of consultation, counseling, clinical, clinical-pathoanatomical conferences, studies with doctors, middle medical workers on professional development. Certification of doctors, nurses, % attestation from the subject's category.

Functions of the resident doctor, his schedule, participation in the diagnostic and treatment process. Control over the observance of sanitary and hygienic measures on the fixed area of work.

Functions of the head nurse. The activities of ward nurses on the implementation of doctor's appointments and control over the observance of sanitary-hygienic, antiepidemic and medical protective regime in the hospital.

Duties of the attending physician, the head of Department, the Deputy chief physician on medico-social examination and medical rehabilitation in the organization of work on examination of temporary disability.

Organization of work and functions of the medical Advisory Commission on medical rehabilitation and examination of working capacity.

Regulations on the examination of temporary disability and rehabilitation in the hospital. Documents regulating the procedure for issuing certificates of incapacity for work and certificates of temporary incapacity for work. The procedure for issuing documents certifying temporary disability.

The main tasks of the medical rehabilitation Commission. Documents regulating the procedure of medical and social examination of permanent disability.

Accounting and reporting documentation used to study different types of morbidity.

Assessment of the quality of medical care provided to the population by structural units and the hospital as a whole. Quality standards (Temporary protocols) of diagnosis and treatment of patients, as well as indications for consultation and hospitalization.

The results of the study of patient satisfaction with the quality of care.

Medical and hygienic training, education of the population and the formation of a healthy lifestyle.

Performance indicators and defects characterizing the activities of the surgical Department of the hospital for 2 years

Calculate, compare and draw conclusions performance indicators and defects that characterize the activities of the surgical Department of the hospital for 2 years.

Assessment of health organization performance based on the outcome model

Calculate the model of the final results of the health organization (Department).

Analysis, conclusions and suggestions

To carry out the analysis of indicators of activity of the organization of health care to carry out in comparison with known normative values, levels for the accounting year or in dynamics. To make proposals to improve the activities of a specific treatment and prevention organization and the health care system as a whole.

Section 5. Organization of medical services for the female population (women's consultation)

General information on women's counseling and health indicators

Principles of medical care of the population. The main orders regulating the activities of the women's consultation.

Number of the female population served by the consultation. The main demographic indicators of the health care area for 2 years: birth rate, total mortality, infant mortality, natural increase. Assessment of indicator levels and their dynamics.

Structure, organization and principle of work of the women's consultation. Tasks of women's consultation. Scheduling.

Medical providing, financing antenatal clinic. Medical services: types and volume in the women's consultation. Accounting and reporting medical records used when working in the women's consultation.

The schedule of the women's consultation, the load of doctors, the function of the medical position. Staffing, security, staffing, % concurrency. Number of obstetric and gynecological sites.

Tasks and function of the registry, its functional units, their role in the diagnostic and treatment process.

Day hospital, organization and principle of work.

Continuity in the activities of the women's consultation. Communication with other health organizations (children's polyclinic, maternity hospital). Organization and holding of consultations, consultations, clinical, clinical and pathoanatomical conferences, training with doctors, nurses to improve their skills. Certification of doctors, nurses, % attestation from the subject's category.

Duties of the district doctor of the obstetrician-gynecologist, his schedule, load, participation in the diagnostic and treatment process.

Dispensary monitoring of pregnant women, the order of registration, examination, dispensary observation and treatment of pregnant women and gynecological patients.

Individual plan of observations of pregnant women, perinatal protection of the fetus, psycho-prophylactic preparation for childbirth.

Control over the observance of sanitary and hygienic measures in the fixed area of work, the organization of social and legal assistance to women, the fight against abortion.

Anti-epidemic measures carried out by the women's consultation, regulating documents.

Regulations on the examination of temporary disability and rehabilitation in the clinic. Organization of work and functions of the

medical Advisory Commission on medical rehabilitation and examination of working capacity.

Documents regulating the procedure for issuing certificates of incapacity for work and certificates of temporary incapacity for work. The procedure for issuing documents certifying temporary disability.

Duties of the attending physician, the Deputy chief physician on medico-social examination and medical rehabilitation in the organization of work on examination of temporary disability.

The main objectives of the medical rehabilitation Commission (MREC). Documents regulating the procedure of medical and social examination of permanent disability. The order of referral of patients to MREC.

Accounting and reporting documentation used to study different types of morbidity.

Assessment of the quality of medical care provided to the population by the women's consultation. Quality standards (Temporary protocols) of diagnosis and treatment of patients, as well as indications for consultation and hospitalization.

The results of the study of patient satisfaction with the quality of care.

Medical and hygienic training, education of the population and formation of a healthy lifestyle.

Performance indicators and defects characterizing the activities of the women's consultation for 2 years

Calculate, compare and draw conclusions performance indicators and defects that characterize the activities of women's consultation for 2 years.

Assessment of health organization performance based on the outcome model

Calculate the model of the final results of the health organization (Department).

Analysis, conclusions and suggestions

To analyze the performance of the health organization in comparison with the known normative values, levels (or actual data for Belarus) for the reporting year or in dynamics. Make proposals to improve the performance of a particular organization and the health system as a whole.

Section 6. Organization of in-patient obstetric and gynecological care

General information on obstetric and gynecological hospital and population health indicators

Principles of medical care of the population. The main orders regulating the activity of the maternity hospital.

Tasks of the maternity hospital. The structure and capacity of the maternity hospital, its units, the number of beds. Scheduling. Medical services: types and volume in the maternity hospital.

The number of served population, its characteristics. Indicators characterizing the state of health of the population, their levels and dynamics.

Medical support, financing of the maternity hospital. Accounting and reporting medical records used when working in the maternity hospital.

Staffing, security, staffing, % compatibility, load of doctors.

Internal labor regulations for employees, internal regulations for patients.

Anti-epidemic measures carried out by the maternity hospital, prevention of VBI among newborns and puerperas, regulating documents.

Structure, functions, documentation, admissions, procedure of admissions, emergency and urgent care patients.

Organization of work of obstetric, gynecological departments, departments for newborns, their functional units, role in the diagnostic and treatment process.

Day hospital, organization and principle of work.

Continuity in the activities of the maternity hospital with other health care organizations.

Management function head of the Department, organization, consultation, counseling, clinical, clinical-pathoanatomical conferences, studies with doctors, middle medical workers on professional development. Certification of doctors, nurses, % attestation from the subject's category.

Functions of the obstetrician-gynecologist, his work schedule, participation in the diagnostic and treatment process, control over the observance of sanitary and hygienic measures in the fixed area of work.

Functions of the senior midwife, the average medical staff of offices on performance of appointments of the doctor and control of observance of sanitary and hygienic, anti-epidemic and medical and protective mode in maternity hospital. Organization of medical nutrition. Organization of care for the seriously ill.

Regulations on the examination of temporary disability and rehabilitation in the hospital. Organization of work and functions of the medical Advisory Commission on medical rehabilitation and examination of working capacity. Documents regulating the procedure for issuing certificates of incapacity for work and certificates of temporary incapacity for work.

The procedure for issuing documents certifying temporary disability. Duties of the attending physician, the head of Department, the Deputy chief physician on medico-social examination and medical rehabilitation in the organization of work on examination of temporary disability.

The main tasks of the medical rehabilitation Commission. Documents regulating the procedure of medical and social examination of permanent disability.

Accounting and reporting documentation used to study different types of morbidity.

Assessment of the quality of medical care provided to the female population by structural units and the maternity hospital as a whole. Temporary protocols (quality standards) of diagnosis and treatment of patients, as well as indications for consultation and hospitalization.

The results of the study of patient satisfaction with the quality of care.

Medical and hygienic training, education of the population and formation of a healthy lifestyle.

Performance indicators and defects characterizing the activities of the obstetric and gynecological hospital for 2 years

Calculate, compare and draw conclusions performance indicators and defects that characterize the activities of the hospital.

Assessment of health organization performance based on the outcome model

Calculate the model of the final results of the health organization (Department).

Analysis, conclusions and suggestions

To carry out the analysis of indicators of activity of the organization of health care in comparison with the known normative values, levels for the reporting year or in dynamics. To make proposals to improve the activities of a specific treatment and prevention organization and the health care system as a whole.

THE RESULTS OF THE PRACTICE THE STUDENT IS OBLIGED

Make a written report on the work performed, which should be:

- reflect performance indicators and defects that characterize the activities of the Department for 2 years (according to reports of health organizations and data of medical statistics offices). In the calculation of quality indicators of activity of the organization health it is necessary to

describe the method of calculation and be sure to specify the original numeric data;

- to evaluate the activities of the medical organization on the basis of the model of final results;
- analyze the data obtained;
- write conclusions and suggestions to improve the performance of a particular health organization or structural unit.
- submit a report for review to the head of the Department;
- sign and certify with the official seal of the health organization the report at the chief physician or the Deputy chief physician on medical part.

A written report on the work carried out is reviewed and signed by the head of the Department on the basis of which the study was conducted.

Hand over to the teacher of the Department responsible for industrial practice, signed by the head of the Department and the chief physician, certified by the official seal of the health organization report on the work performed with the signature of the chief physician of the medical organization.

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ОБЩЕСТВЕННОЕ ЗДОРОВЬЕ И ЗДРАВООХРАНЕНИЕ: РУКОВОДСТВО ПО ПРАКТИЧЕСКИМ НАВЫКАМ

PUBLIC HEALTH AND HEALTH SERVICE: GUIDE TO PRACTICAL SKILLS

учебно-методическое пособие
на английском языке

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